

AVIATION WEEK

A MCGRAW-HILL PUBLICATION

MAY 5, 1952

50 CENTS



HOW TO "WRING OUT" AUTOMATIC CONTROLS FOR AIRCRAFT

That, in effect, is what these engineers are doing—by means of mathematical equations fed into Honeywell's analog computing equipment, part of which is shown above.

Simulated flight testing of automatic controls in this manner is constantly being done by Honeywell aero research men because it makes actual flight testing easier and less costly.

Use of the analog computer is just one example of the kind of research being done

at Honeywell to help build better automatic controls for airplanes. Research activities in the fields of jet engine, temperature and fire control, nonlinear mechanics, digital data operation and control, as well as many others are constantly being carried out.

We expect to expand our research program in the years ahead—because *automatic control* is such an important part of aviation progress. And *automatic control* is Honeywell's business.

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7 Airplane Manufacturers...
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B.F. Goodrich



20% more landings with new B.F. Goodrich dimpled tire

THE NEW B.F. GOODRICH airplane tire has a stronger cord body and new wear-resisting tread with dimples like sandstones in the rubber. These dimples provide better distribution of the tire load and reduce exposure to road cutting. The tread design is a complete departure from conventional ribbed treads.

Northwestern Airlines has complete performance data on all types of tires. When B.F. Goodrich introduced the new tire, it was quickly added to their tire program. As comparative records

of dimpled tires began to come in, the results were impressive. Northwestern engineers found in just about 20% more landings per tire than the next best tire used, accelerated adoption of the new tire in standard equipment.

Northwestern is the sixth airline to report a switch to the dimpled tire. Others who have tried and are using dimpled tires are Trans-Texas, Braniff, Capital, Continental, Empire, Mid-Continent, National, and West Coast.

B.F. Goodrich is now producing the dimpled tire in seven sizes. The new,

larger wearing tire is another example of BFG's leadership in rubber research and engineering. Other B.F. Goodrich products for aviation include wheels and brakes, bonded rubber, De-Icers, Aerons, Plastobond adhesives, Primaco Sealing Tapes, inflatable seats, ball cells, tires, accessories. The B.F. Goodrich Company, Aeronautical Division, Akron, Ohio.

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Both cap and lock nuts. One-piece construction, self-align segments lock positively with uniform torque. Aircraft approved, sizes 1/4 to 1 1/2" inclusive. Regular steel. Flexloc approved for temperatures to 325°F.



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Incomparable. Flexloc Flexloc self-locking principle and one-piece, all-metal construction. Largest NAS specification. Sizes 1/4" to 1 1/2" AP. Thread Series Approved for temperatures to 325°F.

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NEWS DIGEST

DOMESTIC

PAA Stockholders' fund for New York from Rio de Janeiro and Buenos Aires was raising last week with 41 passengers and crew of state. Last reported position was over panic and gas for action in central Brazil.

High-frequency radio channel has been merged to California Central Air line, the first scheduled air carrier to get one under recently adopted international agreement for standardized worldwide frequencies.

Civil aircraft experts during March of plans weighing 6,000 lb and last tested 27 values at \$142,256.

Bell 47-D1 helicopter has been purchased by New York City Police Dept., bringing its capital stock to four. Two more Bell are to be delivered to NYPD by the end of 1952.

Mid-Atlantic collision of U.S. aircraft carrier Wasp and destroy-mine-sweeper Flaherty on night of Aug. 26 resulted in sinking of smaller craft with reported loss of 174 of its crew of 235. No exact casualties were reported. The Wasp, which was on its way to the Mediterranean, turned back for repairs.

W. D. Jones, 46, director of operations for National Airlines, died in Los Angeles, Fla., Aug. 25.

Cost aircraft shipments during February totaled 327 planes, 763,000 lb. airplane weight, valued at \$15.8 million. These were 253 engines shipped totaling 264,900 hp. At the end of the month there were unfilled orders for 686 civil planes of 3,000 lb. airplane weight and over.

Spartan School of Aeronautics has signed contract with American Airlines to provide Link training for applicants. 25 AF crew, including all phases of instrument flight.

FINANCIAL

Leas, Inc., Grand Rapids, Mich., had 1951 earnings totaling \$601,611 after federal taxes, on sales of \$21,227,893. As of Dec. 31, Leas's backlog was approximately \$40.7 million.

Fidelity Investment & Co. Corp., New York, N.Y., made \$317,736 net profit during 1951 on sales of \$56,643,199.

Boeing Airplane Co., Seattle, has received stockholders' approval for an increasing common share from 1,250,000 to 2,500,000. A dividend will be distributed May 23 to holders of record May 9.

Boeing Aircraft Corp., Wichita, voted a 20-cent regular quarterly dividend payable May 15 to stockholders of record on May 5. Net sales during first half of fiscal year were \$79,920,001, with net income of \$9,045,302. Bookings in excess of \$700 million.

Continental Air Lines reports net income of \$57,074 for the first quarter ended Mar. 31.

California Eastern Airways reports a new high of \$6,148,250 in operating revenues during 1951, with net income of \$114,284.

Republic Aviation Corp., Farmingdale, N. Y., notes net income of \$1,357,015 after provision for taxes for the first quarter of 1952.

Aeromarine Corp., Jackson, Mich., has declared a regular quarterly dividend of five cents payable June 2 to holders of record May 15.

U.S. Airlines had net earnings of \$27,811 in operating revenues of \$790,994 for the quarter ended Mar. 31, the first profitable quarter since the carrier began operations in 1946.

United Air Lines just declared its second 25-cent quarterly dividend, payable June 16 to common stockholders of record May 16. United has also declared first quarterly dividend on its new 48% convertible preferred to hold on at record May 16. Dividend is 75 cents stated of the quarterly rate of \$1.24 because the stock has not been out since 1948.

INTERNATIONAL

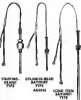
Chacón Sayon, president of the Air Line Pilots Assn., has been elected president of the International Federation of Air Line Pilots Assn., succeeding BOAC pilot B. C. Frost, named vice president.

Canadian government ordered \$25.5 million in aircraft parts, supplies and overhaul work from Canadian firms in the period Feb. 16-Mar. 15. Largest single contract went to Bristol Aeroplane Eng'g Co. (England) Ltd., Montreal, awarded \$11,449,330 for engine repair and overhaul.



for Aircraft

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Resistance bolts in demand for their accuracy with the wing surface. AN-100S-1 and AN-100S-2 standard type with 1/8" threaded head accurately installed. These bolts control the temperature of the wing surface and prevent overheating of the wing surface.

Temperature-type with 1/8" NPT threads. It is suitable for measuring high temperatures.

By the Lewis Resistance Type has positive resistance element in the wing surface. It is used with more accurate than any other type of temperature measurement.

Long-term Resistance Type, used with AN-100S-1, is used in measuring the temperature of the wing surface and prevent overheating of the wing surface.

In addition to these elements, we also have other types of temperature measurement.

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Although the R-502 LINEATOR—our largest electric linear actuator—weighs less than 22 pounds for a 6-inch stroke, it has a working capacity of 5 tons minimum and an ultimate static capacity of 10 tons.

Speeds—at 10,000 pounds load—are from 10 to 25 feet per minute, depending on the motor and gearing. The R-502 has noninterfering internal positive stops and adjustable limit switches which operate through external relays.

Dimensions and performance data—with maximum power motor—on R-502 and other Airborne Linearas are given in the IAS Aeronautical Engineering Catalog.



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AVIATION CALENDAR

Mar. 8-7—Symposium, "Progress in Quality Systems," Cosponsored, sponsored by Institute of Radio Engineers, American Institute of Electrical Engineers, and Radio & Television Manufacturers Assn., industrial sessions at Dept. of Interior auditorium, registration at Regent South Hotel, Washington, D. C.

Mar. 9-16—International Air Transport Assn. technical conference meeting, Copenhagen.

Mar. 8-8—Fifth annual Western Aeronautics Conference, Hotel Northland, Corvallis, Ore.

Mar. 21—International Air Transport Assn. technical conference meeting, Boston Area.

Mar. 22-16—National conference on airborne electronics, co-sponsored by Institute of Radio Engineers' Dayton section and Professional Group on Airborne Electronics, Dayton Science Hotel, Dayton, Ohio.

Mar. 24—National aircraft technical conference, Aeronautical Industries Assn., Marriott Hotel, Washington, D. C.

Mar. 24-26—Society for Experimental Stress Analysis national meeting, Hotel Lincoln, Indianapolis.

Mar. 25-16—American Helicopter Society annual forum and banquet, Hotel Washington, Washington, D. C., May 17-18, at New Balling Field.

Mar. 28-30—American Industries Assn. Board of Governors meeting, Williamsburg, Va.

Mar. 30—National Aircraft Parts Day dinner, Sheraton Hotel, Washington, D. C.

Mar. 25-16—National Flight Air Meet and Race, Chattanooga.

Mar. 29—International Air Transport Assn. technical conference and technical research meeting, Copenhagen.

Mar. 30—Institute of the Aeronautical Sciences meeting, Cleveland Area section, Cleveland.

Mar. 21—International Air Transport Assn. annual committee meeting, Rome, Italy.

Mar. 22—American Rocket Society dinner, Hotel Astor, New York.

May 22-23—Aeronautical Training Society annual meeting, Colston Hotel, Washington, D. C.

May. 13—Philadelphia Aviation Country Club annual spring picnic, Wings Field, Ardmore, Pa.

June 1-4—Society of Automotive Engineers annual meeting, Ambassador and Ritz Carlton Hotels, Atlantic City, N. J.

June 1-4—Council for military aircraft stand still, Aeronautical Industries Assn., meeting, Hotel Statler, New York.

June 8-13—Naval Air Protection Assn. annual meeting ending session in June 10, Hotel Statler, New York.

June 13-20—Aircraft Trade Shows (aeronautical related of aircraft parts and equipment), Hotel Park Sheraton, New York.

PICTURE CREDITS

1—Orel Greenberg Co., Greater Boston; 2—Wichita Falls, Tex.; 3—JAF, Inc., Dallas; 4—Lockheed, 11—Boeing, 12—Boeing Aerospace Co., 13—Pitts Aircraft Co., 14—United Aircraft Corp., 15—Boeing; 16—Green 501 World News, 18—Associated

The Week's Plane News In Pictures



FIRST TIME UP—Greenberg Co. (above) shows its initial flight test with pilot Jim Ryan at the controls. The big control seat can seat 6-7 or pilot standard and three crew. (See Aviation Week Apr. 25, p. 25 for engineering analysis.)



FIAT SHORT—New Italian Fiat G.91 jet engine produced during a flight test a first of three versions each powered by different engines. This model has the DH G.91, the second will have a DH G.91, the third will be fitted with a Rolls-Royce Trent. G.91 seats two in cockpit, has 500-cup top speed, 16 ft. (See Aviation Week Apr. 27, p. 25 for engineering analysis.)

F15 IN KOREA & AT HOME—Two different aspects of the Republic F-15 show two Thunderbolts (below) being loaded off a Korean air base by B-70 on their way to drop bombs on an enemy target, view at right displays plane's top speed. (See Aviation Week Apr. 27, p. 25 for engineering analysis.)





"Jetson city" is developing, since new capable of handling jets were powerful fans say are in existence. This shows one of the jet production engines have also been added.



New office building is planned of jet engine, four-level construction and does not contribute to efficiency.



New machine, photo goes to tolerance of .0005 inches. Modern machinery like this speeds jet production.



Test cell under construction. It is "Jetson" in addition, engine and expanded in size to house instrument assembly.

JET CENTER, U.S.A.

Nearly four million square feet of floor space, employment approaching 4000, and some of the most modern and complete jet-producing facilities in the world make up "Jet Center, U.S.A.," the new General Electric plant in Louisville, Ohio. Dedicated on the tenth anniversary of the first American jet engine, this new jet plant will be a tremendous factor in the future of American aviation.

Lockheed provides for rapid expansion to meet national emergencies as well as a foundation for peace time production. While its recent rapid growth has been due mainly to the demands of increased aircraft production, Lockheed will remain to speed up the progress of aviation and to build new engines and accessories. Features of the new plant are a new parts production building and a new engineering and administration

building, both recently completed, and a new Components Development Center now under construction. One large building, previously used for assembly of production engines, is now devoted to development work to bridge the difficult gap between experiment and production. Two large new test cells, with a common control room, have been built expertly large to accommodate engines of extremely high thrust ratings.

During the fastest ten years in history, jet engines designed and developed by General Electric have powered more planes, set more records, and flown more hours than all other U.S. jets combined. Now, with this experience, a team of skilled workers and the new facilities available at Louisville, General Electric works for the future.

314-48

You can put your confidence in—

GENERAL  ELECTRIC

WHO'S WHERE

In the Front Office

James (Jack) Stinson, general manager of Douglas Aircraft Co.'s Long Beach division since 1951, has been named vice president of the firm. Stinson joined Douglas in 1927 following graduation from the RAF. Mr. A. K. Koenig has been designated controller. He has been with the Douglas organization since 1930.

Arthur P. Davis has returned from three years to become president of Aero Corp., New York design firm, and Donald B. Hess, former president of the company and also head of the parent firm, American Aircraft Corp., has been elected vice chairman of Aero. Co. formerly of Aero, Davis had been president of the company since 1947, when he returned from three years of service in the United States.

Changes

George Crothers has been appointed manager of the new Toronto, Canada, branch of General Controls Co., with headquarters at the Commonwealth Building.

Howard W. Merrill has been designated chief developmental engineer for Glenn L. Martin Co., Baltimore.

Capt. Maurice Luby is leaving on July 1 at Dayton as director of Engine Research and Development (V-6), British Ministry of Supply, to become director and general manager of Rotor Ltd., London. He is also being named a member of the board of Joseph Lamb (The Turbine Equipment Ltd.).

James K. Koenig has been appointed vice president of the new Detroit office of General Electric, New York. Wade P. Koenig has been promoted to General Electric vice president.

Henry D. Venn has been named chief test engineer for General Electric Corp., Windsor, Ontario.

James R. Meyer has been appointed vice president for Douglas Air Lines, with headquarters in London, replacing Eugene Smith, who is being named back to the U.S.

George Martin has been named director of publicity for Northrop Aircraft Co., Inc., Los Angeles.

C. Robert Henry has been designated director of local development and governmental affairs for Hamilton Air Lines.

Honors and Elections

Robert O. Fikes has been elected chief pilot and representative of the Civilian Flight Corps to become executive director and member of the Corporation American Overseas.

Dr. Louis Van Hook Thompson, vice president of Nucleon Laboratories Corp., White Plains, N. Y., has been elected for the National Aeronautics Administration.

Carl M. Springer, manager of cargo sales for Capital Airlines, has been elected chairman of the Cargo Advisory Board of the Air Traffic Conference of America.

INDUSTRY OBSERVER

Canada will supply four Royal Canadian Air Force squadrons to the North Atlantic Treaty Organization by year end 1952 and is committed to a total of 12 by end of 1954. Two squadrons already are stationed in England and others are being trained during the next two years will leave in Germany, France and England. Canadian officials expect air crew training to now proceeding at a rate of 1,000 annually.

Lock & Heintz will soon begin operation of its plant No. 1 altitude test chamber. Test facility, built at a cost of \$150,000, is reported accurate up to altitude equivalent of 100,000 ft. Company will not test chamber to prove out its extensive shops.

Hydromatic Press, Inc., Mt. Laurel, O., is manufacturing a new press for North American Aviation. The press, reported in the 7,800 ton capacity class, will take about one year to build.

University of Detroit has been conducting wind-tunnel simulation tests of a new type helicopter for McDonnell Aircraft Corp. Reports are that the tests are the second of series conducted by the university. First series were conducted in behalf of jet aircraft and related aircraft research projects.

Bentley type 175 altimeter, of which 25 are on order for British Overseas Airways Corp., will be received by King Aircraft Products 5 yrs (ten-year) service during that time 16 ft. dia. dia. (five-foot) hollow shaft propeller. The new No. 1 altimeter propeller has completed 17,000 hr. on test beds and is being shown at Amesbury, Mass.

Sales campaign by Sperry and Eclipse-Posner to sell altimeter approach complex to the airlines now under a series of trials at the Ontario Airport, Canada. The altimeter approach complex is being tested, thereby, against the risk of the complex for low maintenance.

Further examination of the Los Angeles S-75 Sikorsky helicopter damaged in a recent crash, has shown that the machine is in repairable condition; it is to be shipped back to the factory at Bridgeport, Conn.

The twin jet GE-100 Canuck nightfighter built by Avon Canada, Ltd. will be the first plane to experience the world's largest airframe, since the aircraft of the aerial maneuvers has been assigned to join the Canadian fleet as a test pilot. He is Jan Zdzienicki, former Polish officer who shot down six German planes in the Battle of Britain while flying with the RAF. He has been test-flying with Canuck since 1947. The altimeter approach complex is being tested at the Ontario Airport, Canada. The altimeter approach complex is being tested, thereby, against the risk of the complex for low maintenance.

Vickers is testing the drive to suit a helicopter motor, transport version of an existing four jet Vickers helicopter, but RAF Transport Command units have not yet been awarded. Sales agreement is that standardized engines and good portion of the engines could be used to drive the same line for both bombers and fighters.

Although USAF officials expect aircraft manufacturers to have great difficulty in meeting production schedules for the next six months, March deliveries of between 350 and 400 planes were a little ahead of schedule. USAF expects a plant in "deficit" when it is fully equipped for year-round use, which may be some time after it is "accepted" from the manufacturer. March bomber deliveries were less than 50, a jet fighter much in demand in Korea is back on schedule after missing behind most of last year.

After completing preliminary test flights from Laramie AFB, Moore Lake, Wyo., the eight jet Boeing B-52 heavy bomber has flown back to its home plant at Seattle and will operate from Boeing Field, "jet capital" for the next phase of tests, according to Boeing announcement.

A French process for building aircraft wings of pre-stressed concrete is expected to have a future in construction of aerospace planes where high wingloading is a requirement. An experimental wing developed by Buguet is expected to have greater strength than conventional wings of comparable size, besides being cheaper and easier to build.

Washington Roundup

New Approach to Air Power

A new approach is being taken by Senate Preparedness Committee in reauthorizing its case for a speedy buildup of air power.

That U.S. air strength should be geared to balance enemy strength, said to be behind the continued renewal of the stock concern in Congress.

The committee, headed by Sen. Wendell Johnson, is now gathering comprehensive data to knock down the congressional move to build back money for air power and get off aircraft and goods for a 145 percent Air Force and 160 percent Navy in 1956 to 1957. It plans to show that:

- The Soviet Union and satellites now have a decided edge qualitatively and, in many respects, quantitatively over Allied power in air strength.

- A quick buildup of air power will cut the time lag in all-out thrust a drive-out buildup by maintaining overhead.

This is the Committee's strategy:

- First active industry and leaders in all the second session.
- Then return to leaders who, while active officers, are not under obligation to support the Administration's program in open session. Committee already has heard three such a spending. Gen. Carl Spaatz, USAF's first Chief of Staff, Lt. Gen. Bruce W. Whitcomb, former command general of Air Defense Command, and Lt. Gen. R. B. Wiley, former Deputy Chief of Staff for Materiel.

- Have staff members make field checks on production to determine the quality of engines, in particular, and whether output can be stepped up.
- Let USAF close its own house. Showing its appeal everywhere in the letting contracts at Wright-Patterson Air Force Base, the committee's efforts.

- Let AR act off itself, on the committee's appeal. But these will get Congressmen, arguing that the U. S. can get the same defense for less money through more efficiency, more innovation.

- Participate, as ex-officio members, in Senate Appropriations Committee's consideration of the coming 1955 fiscal year defense budget.

Carrier vs. Land Base

Argument over the carrier as the land base is becoming increasingly heated, as Congress pushes where to refuel bases for defense.

A newspaper column attacking carrier aviation as too costly and spreading land-based air, reportedly promoted by the Air Force, ignited it all recently.

The claim that outfitting a Naval carrier fleet for combat costs over \$4 billion, while outfitting an equivalent striking force of 40 B-36s, including an air base defended by radar, 100 B-29s and 100 B-50s, would cost only \$475 million, or one-seventh as much.

Publication set off this concern:

- USAF Chief of Staff Gen. Hoyt Vandenberg dispatched a telegram to all commanders continuing against all considered statements.

- Secretary for Air Thomas F. Feltz immediately told: "I have USAF public relations staff from Vandenberg's office, placed in their office, remained at 'Office of Public Information'."

- Naval leaders challenged the press.

Chief of Naval Operations Adm. William F. Friedman reported: "The cost of outfitting a carrier task group of

four large carriers, four heavy cruisers and 12 destroyers at present prices is \$2.4 billion, not \$5 billion, as has been claimed."

Assistant Secretary of Navy for Air John Floberg responded: "There have been suggestions that the comparative cost of a first carrier task force with land-based striking bombers against increasing the Navy's carrier strength."

The record of the Navy's... conclusively demonstrates an ability to achieve military results with a minimum of money.... I feel it is how we can logically... undertake a program of investing billions of dollars in carrier bases and overseas-based forces and then hesitate to invest a relatively small fraction of these billions in the tremendous cost material in making these bases trouble and those forces appreciable."

The program of ten 60,000-ton carriers has just not being considerable about it—don't think that we can afford to build these ships at a cost of a million a year. The cost of all ten of these vessels, substantial though it obviously will be, will not amount to much compared to a couple of land bases.

Carrier aviation has suffered the first blow: The House struck out funds for a second 60,000-ton fast-deck carrier to accommodate planes that will be available before the carrier could be completed in four years.

Reasons were not the only motive for the House action: Navy gave the carrier No. 1 priority in its shipbuilding program, often to accept a cost equal to its cost by eliminating lower priority ships scheduled in the program.

Floberg's observation: "The elimination of the carrier could not, therefore, have been based upon consideration of economy.... To deny the Navy this type of ship is to deny the Navy the air in a very few years of the last phase which attacks can build for carrier attack."

Vandenberg's Reappointment

Secretary Thomas Feltz justified the way for Senate confirmation of Gen. Hoyt Vandenberg's reappointment for 14 months as Chief of Staff.

Senate Armed Services Committee members originally planned to hold up confirmation until the President had the "house" given for suggestions. "So that he might avoid us for full 90 days of military service as Chief of Staff," Committee members thought it an undignified precedent that, once Chief of Staff, an officer would stay at the post until he reached retirement.

Feltz introduced with a statement to the committee making these points:

- At no time during discussion with the President was the reappointment justified on the grounds of Vandenberg's expanding retirement age.

- Currently, the President's direct appointing Chief of Staff to other command posts also a favorite trait of duty.

- But because of the great number of changes in the top USAF command during his short career in Secretary, he served longer at Vandenberg in for continuity and until other prospects for the top post acquire broader experience.

Also confirmed by the Senate: Gen. Curtis LeMay to be Vice Chief of Staff and Gen. Nathan Twining to be commanding general, Strategic Air Command.

—Katherine Johnson

AVIATION WEEK

MAY 5, 1952



HEART OF USAF being is the building group at top center of this photo of Wright Field—a well one of immense strategic importance

New Light Shed on AMC Decentralization

- Scattering buying and supply among 15 depots may not save much either in money or manpower.
- But there are other prime reasons: It will simplify logistics and ease administrative problems.
- And, above all, it will disperse a major target for potential enemy bombing or sabotage.

Depot, O.—The most fundamental change in Air Force procurement procedures in Air Materiel Command history is being worked out at Wright-Patterson Air Force Base here. The huge centralized buying and distribution structure is slowly and steadily being dismantled for reasons only now coming to light.

Procurement of nearly everything but airplanes, aircraft and propellers is being scattered from coast to coast and under to border (Aeronautics Week Apr. 31, p. 12), spread by three major air departments.

- Strategic. The Air Force has been getting increasingly uneasy over the fact that the base and strength of the Air Force body is concentrated in a relatively small area not outside the industrial city. From Wright-Patterson AFB is proposed the business for the aircraft industry that supports USAF. Through Wright-Patterson goes the material to fund USAF's army or power. Knock out the base by sabotage or enemy attack and USAF would be dangerously crippled.

- Logistics. Most USAF supplies are stored elsewhere than at Wright-Patterson. But order to replenish the stock do not come from their supply depots. The depots requisition material, AMC headquarters orders it. This requires administrative dissemination and, more decentralization, much time. Airplanes to men, and so, get perhaps low while the requisition goes through channels.

- Administrative. The Wright-Patterson base can get very large administrative without being misled in a mountain of paper based in red tape. It now handles accounts of a million and a quarter pieces of mail and 45,000 telephone messages a month. Lt. Gen. R. M. Rowlands, AMC commander and architect of the decentralization, says that in all-out war Wright-Patterson would have to expand 25% above its present 30,000 employees. And he says in effect, it's too big now to be administrated efficiently.

In the face of these outstanding con-

siderations, the huge and at times better organized to decentralization is not expected to bring a reversal of the plan. The best the opponents can hope for, it occurred last week, is modification.

- How to be tried—Gen. Rowlands in discussion with those Aeronautics Week editors, gave the impression of a man not planning to know all the answers. Perhaps decentralization is now considered will work perhaps it won't. But, Rowlands explained, something has to be tried. For years all concerned have admitted that Wright-Patterson's system is too big to be operated at maximum efficiency, yet nothing much was done to change it. Rowlands, at least, is going to try.

And he is backed up by his superiors in Washington. Highest Air Force officials last week and Rowlands was sent out to visit two to assign an AMC. He drew up his plan, submitted it to Washington and got approval which already was in effect.

When the decentralization was first announced to AMC employees and officers, the major reason cited was economy. Only now are the three aspects listed above being stressed the real reasons. To veteran observers in Dayton these three reasons make a better case for the plan. Money comes in the name as doubtful and unobtainable. At Gen. Rowlands says, "How do you measure dollar savings in spending up our work?"

- Pre-Adm.—The Dayton Chamber of Commerce, which previously con-

As long as the individual is physically and professionally qualified and as long as he is not conscientious objector, voluntary inspection from flying status will be imposed only "under the most unusual circumstances."

An individual who states in writing or exhibits his fear of flying will be examined by medical officers. If found disqualified due to psychosomatics, he will be grounded and given proper medical treatment.

If an individual is declared qualified and yet seeks to avoid hazardous duty, as particular training job and actual combat, he has failed to live up to Air Force officer status and should be separated from the service. Further detail desired.

• Remove Problems—Two categories are included among the 14 categories:

• Voluntary retirement, who have a financial obligation to fly for the Air Force since the end of World War II when they were released from active duty. This group has been discussed in numerous times from the Air Force for several years and several times. They know this, could be called to active duty for combat at any time.

• Involuntary reserve, officers during World War II, who were discharged following that duty and have been in no part to active reserve training activities.

Both Army and Navy are working USAF officers problems. Thus, too, face similar situations. All three services are pushing reserve programs and personnel to military service, to active duty and to get a more active role in service. Simultaneously, all are reviewing and reviewing combat status on new to make combat duty in Korea more palatable. Then new recruits completely confident, but undoubtedly will result in less combat theater time.

Closing Hurt Newark, PNYA Head Says

Closing of Newark Airport to commercial traffic since Feb. 11 following three crashes into nearby Elizabeth, N. J., has resulted in definite financial hardship for local business firms and has pointed up the dependence of the industrial community and citizenry on close air transport facilities. Post of New York Authority Chairman Howard S. Gibson claims.

Speaking before the Queens, N. Y., Chapter of Commerce recently, Callan stated that these economic aspects and the reliance on air transport and transportation help to jobs in the port community. "If that machine were critically disturbed," he warned, "most of us would have to pick up belongings and look for work elsewhere here." According to a statement conducted among New Jersey businessmen, Callan

Stick Asks Mail

Stick Airways last week applied to Civil Aeronautics Board for permission to carry air mail and to express not only at a "non-scheduled" rate, but at a rate much lower than the 45 cents a pound set by CAB for American, United, Eastern and TWA.

Stick says it shows has been willing to carry mail without a subsidy, but that at the time its all-cargo certificate was granted in 1945 mail rates continued solely payments needed by the passenger market. That no longer is true, Stick and Stick carrier cargo for about 15 cents a pound and "would obviously be willing to carry all mail" at 45 cents a pound.

But members of an "all-cargo mail rate classification" in its order, the carrier told the Board. That would also apply to the parcel post. Presently, it would be well below the 45 cents a pound set by the "Post Office" rate. CAB considers noncompetitive. Stick says that rate was set to create costs of operating continuous planes, not all-cargo craft.

Stick also mentions it could easily expand capacity from the present rate of about 60 cents a ton-mile rate to a range of freight rates, including pickup and delivery "continues to not exceed 15 to 20 cents a ton-mile."

men received, 54% considered air passenger service at either vital or important to their business and 75% reported they had lost some or most business of the Newark Airport closing. One company and closing the field has resulted in an temporary dropping in mail to put up another factory in New Jersey.

Callahan also mentioned the airport's role in providing local employment in the three fields under PNYA jurisdiction—Newark, LaGuardia and Mitchell—now employs 15,500 and has an annual payroll of \$70 million. He expects that by 1967 the fields will employ 12,000 and pay out \$190 million in salaries annually. In addition, by 1967 the three airports will account for a \$300-million annual gross product, including maintenance, food and services, but not housing hotel sales.

The PNYA chairman also discussed the National Air Transport Coordinating Committee's role, under the leadership of Eastern Air Lines' President H. H. Arnold, in working out a program of expanding emergency operations over

deposited population areas. Flight school was adopted by the airlines co-operatively so that the LaGuardia Field had actually was discussed following the closing of Newark airport, he declared.

Navy Accepts British Carrier Catapult

Navy has accepted a British-developed steam-operated catapult catapult which will enable U.S. carriers to load planes into the air deck or along side a dock.

Named the "steam catapult," the new catapult (Aviation Week 24, p. 32) was tested for Navy by the British carrier HMS *Perseus* at the Naval Station, Philadelphia, at Norfolk, and at sea early this year. The Perseus has now returned to its base in Britain.

Navy officials said that the first U.S. steam catapult would be installed aboard the USS *Hamock* (then class), which was undergoing modernization to be completed in 1974, including strengthening deck, larger elevators and heavier landing gear.

First tests will be conducted from the British carrier U.S. steam catapults are being in production form. The steam catapult is also being considered for use aboard the \$7,000 ton supercarrier "Farewell," Navy said.

Cause of Near-Crash Revealed to Pilots

Cause of the recent near-crash of United Air Lines DC-8 taking off from Midway Field, Calif., was announced by passengers mail cargo too far in the plane, CAB investigators said. Mail had been reported in a "West Coast pilot" meeting.

The plane took off 90 days after the crash. It rolled the field and one half hour before the crash. Mail cargo was reported in the plane. They landed three minutes later, having ground no more than 300 ft. of altitude.

Cargo was 99 lb overweight for the cargo net, Mitchell said, and 21 lb overweight for the 25-passenger DC-1. This caused loading at 10% from center of gravity. Company limit is 25% and maximum allowable for the aircraft is 25%.

The overloading caused the fuselage to bend, one of the cabin's cargo netting, the CAB investigators told the pilots.

Get in the Scrap—Yun Yoon in for Defense

Aro Tells Its Story to Congress

Sverdrup and Parcel says project comprised 40% of firm's 1951 work, accounted for 15% of its profits.

Congressional bills of opinion of the new USAF Arnold Engineering Development Center at Dayton, Ohio, have ordered a strong counter-statement from the aviation, Aro, a subsidiary of the St. Louis engineering firm of Sverdrup and Parcel.

Comments of the agreement between the firm and USAF for management of the facility and its expensive testing equipment was stated in a report to the House Appropriations Committee.

Regarding the Sverdrup and Parcel position in the official position of the Air Force that final judgment of the operation of the facility at this early stage "would be both premature and unfair."

An Aro spokesman stated by James T. HRL USAF general counsel, in a letter to Congress has full confidence of the department of Air Force officials, Aviation Week has learned. The letter also said that the contractor has given a full opportunity to be heard. It stressed the value of the facilities to be opened at the center and difficulty in getting computer technical personnel to operate them.

• **Fuel Position**—Behind the argument and decision to put the center under private industry operation, Air Force officials say, are their basic research contracting factors.

• **Private industry** can operate a more research facility at less expense than the government.

• **Lack of permanency** of military agreements in specialized fields requires continuous control and operation of such large programs.

• **Continuation** of work in U.S. Civil Service systems regarding pay, length of service, personnel independence and employment termination are sometimes non-negotiable.

• **Delay in work** projects and progress as government-operated facilities due to administrative and time have costly loads in dollars and national security.

• **Cost of Aro**—As an attack upon members of the Air contract, Rep. Albert Gore said on the floor of the House that Sverdrup and Parcel, holding a contract for performance work and plus use of USAF's \$150 million Arnold Engineering Development Center, had spent approximately \$10.5 million for "preliminary paper work before it ever moved a shovel of dirt."

In rebuttal, Sverdrup and Parcel point to documents submitted to the House Committee showing that John

I. Parcel of the engineering firm was hired by Air Force to assist in rapid construction at Wright-Patterson AFB in May, 1945. The company and other firms submitted written offer proposals to provide design and engineering services for the new proposed center.

A. J. Sverdrup and Parcel told the contract went to his company because its proposal "concentrated the low cost and best selected."

In this connection, the company disclosed, AEDC contracts in 1951 covered approximately 40% of the firm's work, while they amounted to only 15% of its total profits.

• **Reply to Gore**—Replying to Gore's attack, company reports submitted to the committee show that instead of the \$10.5 million cost charged by Gore, "in May of 1951, 1950, the government had spent under Sverdrup and Parcel" contracts for engineering services (including fuel) approximately \$5.5 million. In contrast, about \$10.5 million was used for actual construction. And this included some final design, plan and specifications for use in actual construction.

Answering Gore's reference to construction of "a shovel full of dirt," the company pointed out that "because of construction contracts and supervision of three performance are functions of the Corps of Engineers and not Sverdrup and Parcel in the Air Force." Actual construction was begun in Feb. 1950, the day after completion of the \$7.2 million expenditure, Sverdrup and Parcel stated.

After selection of the Tullahoma site Congress voted authorization for AEDC construction and Sverdrup and Parcel was awarded a second contract, AFM 3 (31) 9003, in Dec. 1949. This contract included a total estimate of \$6,875,411.53 and a fund for \$444,444.11. It provided for master plan, construction drawings, specifications engineering planning. According to the company, this contract is now 40% complete.

• **Organization of Aro**—In April, 1950 Aro was incorporated. Stock was held equally by Sverdrup and Parcel, Inc. and Arnold Engineering Corp. The same Aro was a contractor of Arnold Research Corporation.

Shortly after, Air Force notified Sverdrup and Parcel that because Aro plan manufacturing or might manufacture products which would be tested at AEDC, neither Aro nor any other aircraft manufacturer would be allowed to participate in the center's operation.



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PRODUCTION ENGINEERING



DRILLING of spars is one of the preliminary steps in Prewitt blade production.



COATING of adhesive is applied by hand and paint brush in the straighten adhesive.



FINISHING coat of adhesive is applied to trailing edge after tacking.



BONDING takes place in this steam-heated mold where bonded materials are clamped together.

New Techniques Build Prewitt's Rotors

Hollow, all-metal rotor blade was designed with eye to fabrication ease; in production for HUP-2.

By David A. Anderson

A new kind of helicopter rotor blade is in production at the Prewitt Aircraft Co., Camden Heights, Pa., slated for the Prewitt HUP-2 two-engine copter.

It is all-metal—steel spar, stainless steel skin, aluminum alloy rib—except the parts are bonded together with adhesive.

It has been designed with high production methods in mind, and the tools are simple and adaptable.

It has high aerodynamic efficiency

and graceful, close tolerance contours. It is completely hollow, which makes it a natural fit through popliteal in airframe.

■ **Gauge Start**—Development of the new blade was started by Richard S. Prewitt in his garage six years ago. Prewitt consulted manufacturers and the services for individual conception of blade characteristics—what made a blade "good"—and put the results into a test design. That design was selected by the Navy in a 1960 competition among blade designers, and Prewitt

set the go-ahead for development.

To complete his design, he had to pioneer most of his features. Paramount among the problems was the adhesive process for metal-to-metal bonding. Lightweight adhesives had to be created. Blades had not been covered with stainless steel before. A steel spar had to be drawn from circular tubing to a D-section, and to have increased thickness—which equals strength—at the root.

Besides, there had to be a method to guarantee the constant and reproducibility of the blade.

■ **Tests Completed**—The first set of blades completed what tests at Wright-Patterson AFB by mid-1969, and ex-

ceeded applications in even greater. By March, 1970, the first blades with optimum twist were delivered to Prewitt Helicopter Corp. for flight tests. By September, a set had been installed on a first-down copter test rig for a 120 hr endurance run.

Prewitt received a letter of intent for the production of blades for Prewitt area before first-down tests began. The factory now has had seven from gauge and call to 1,700 sq ft of floor space in 1969. About mid-1971, an additional 15,000 sq ft of space was leased for offices and production. Most recently, Prewitt incorporated an additional 50,000 sq ft of factory space at the present site.

■ **Equidistant Mold**—Key tool in the Prewitt process is the heated mold—described by Martin Linton, head of the experimental shop—which holds and bonds the blade components into an accurate assembly. The mold is built of sections brought out by a punch press, laminated together like the sheets in a hot bend, and through-bored with vacuum rods. Steam is circulated through passages in the mold for heat to cure the components to the curing temperature of the adhesive.

There are several interesting features of the mold design.

- First, it is cheap and simple to manufacture, because it requires only two-dimensional working instead of three-dimensional working.
- Second, since the master punch die has been made, molds can be duplicated to the least of the die.
- Third, forming a constant-chord constant-thickness blade, one length of blade can be handled simply by punch and set using large machinery.
- Fourth, if the blade calls for twist, the mold itself can be twisted and re-clamped in the correct position to build in the angular distribution along the blade.

Punch applications permit spans of these tools and processes, including the mold.

Prewitt's shop is set up so that the most complex operations are performed by subcontractors with specialized tooling. The steel spar, spine, of D-section, is drawn by the Elwood Brass Tube Works, Philadelphia. The stainless steel, a positioner machine, is supplied by Ames Tool and Die, Philadelphia.

■ **Steel Spine**—Production of the blade begins with treatment of the steel stock, which is 0.015 stainless steel. It is received in coils of 36' width, and moved through a special machine which draws the stock drawing and draws it then onto the stock on one side with the metal bonding adhesive. The adhesive is known by several trade names; Prewitt uses FM 45, supplied by Thompsonville Rubber Co., Clinton, Pa.

After coating, and while the stock is passing through the machine, it is drawn and cooled again.

The single machine takes enough steel in 24 hours to make 150 blades for the Prewitt HUP-2.

■ **Steel Spine**—Following the steel spine for assembly, the spar is secured, stepped, in the "m draw" condition. So the first step is to straighten the spar. This is a rather tricky process, because of the D-section shape of the spar. But since special rolling tools are developed by Prewitt handle the twisting process easily.

After straightening and tensioning to length, the spar is twisted. Twisting for this step is typical of the approach used throughout the plant in the development of simple jigs, molds and fixtures.

The spar twist is made from an I-beam, a plumber's pipe over and held a foot transverse. The I-beam is the rigid frame of the twist. The spar is clamped at its head and in the pipe over and the top is inserted in a bar, which is fastened to the transverse frame shaft. By manually turning the transverse shaft, the spar is twisted.

After this, it is cleaned, heat-treated and subjected to the regulations of tip balance weights. For final preparation, the spar tube is sand-blasted, cleaned again, cross-bored and dipped in adhesive.

■ **Leading Edge**—In preparation for the first assembly step, the skin leading edge has to be formed by a radius. Again, ingenuity has found a substitute for the expensive blade normally used in the job. A simple plywood table has been built, with a hinge along its rim width. The skin is placed on this table, and the table is folded until the edges of the sheet match. Then, the edges are clamped and the table is straightened. With the sheet extended to both edges along a single line, a heavy steel roller is placed at the match line and rolled forward manually just far enough to put a permanent set of correct radius into the skin section.

The integral stiffness drum must also be prepared for the first molding process. The sheet is secured in a chamber, clamped into the form die. It is then placed in a furnace which holds the sheet extended and serves to heat coats of the bonding adhesive as printed on. Right now, this is braided in by hand, but Prewitt is investigating a faster approach which would probably involve a roller method of application.

■ **Final Assembly**—In building the blade, the three basic components—spar, rib and external skin—are first twisted together.

With this twisting complete, the trailing edges of the skin sheets are control-



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with more adhesion between the rivet
and the plate. After coating, an in-
flatable rubber bag is fast through the
open space between the rivet and a spe-
cial fixture. Then, a U-shaped, trans-
verse clip is placed in the assembly.

The whole work then goes to the
press mold for final bending and
forming. With the mold held in place, the
bag is inflated and the mold heated for
the correct bending cycle. During this
process, the different rivet stock
thicknesses to the die, and the entire
work is held in a further coat.

Cooling first for the rivet, the
rivet process is about evenly divided be-
tween set up and loading. One reason
for the length of the bending time is
that the rivet must be brought up to
temperature, held there, and then cooled
sufficiently to a temperature at which
the assembly can be removed from
the mold.

Final Steps—Once out of the mold,
the rivet, the blade can be trimmed, after
which it is inspected. This is only one
of a mass of continuous operations
which control processes and dimensions
throughout.

Zero-clearance bare finishes are
achieved inside the blade to protect the
internal surfaces against corrosion.
Blades are checked at an angle and at
toward to date.

Fabrication of the blade assembly
continues with the application of a hot
backlash and a hard top. Skin finishes,
some clamps and other rivet fittings
remain to be added.

The HUP blades have this step com-
plete with hole attachment fittings,
ready to install on the cockpit. Only
remaining operation is balancing and
final inspection.

Balance—Short-bladed blades are
made first in a clockwise direction and
then reverse. For clockwise checking,
the blade is suspended at about the
quarter point of its length. Symmetric
balancing of the blade is done with its

outboard end positioned from away an
controls by a control that over the major
portion of the blade. These blades are
checked in the lower of a master blade.
This is, of course, only static balancing.
But the symmetry of the blades is
such that static balance is equivalent
to dynamic balance, Prewitt claims. It
is not necessary to adjust all blades on
a rotor head to get dynamic balance re-
sponses. It is inherent in the dynam-
ic stability of the Prewitt blade.

Final step in the processing was the
blade through three sets of inspection—
Prewitt's, the Navy's and the prime con-
tractor's. The blades are then packed
for delivery.

Reason for Expansion—Prewitt has
enough orders on hand for the HUP
blades to keep production rolling at its
two factory sites. But there is more
for expansion—and the activity toward
the plant shows the first signs of bigger
blades to come. In addition to the HUP
production line, there are development
blades under way for both Navy
and Air Force.

The company's blades have been
used with both basic types of rotor pro-
pellers—conventional transmission at the
hub and constant propellers of the type.
They have been fabricated in chord
races from 5 in. to 28 in.

Prewitt's process is ideally suited for
an expanding industry, lack produc-
tion potential was designed into each
step. The adaptability of the mold for
blades of varying twist, or increased
span, and the simplicity of mold con-
struction are unique features of the
process.

Prewitt himself was the guiding hand
for the whole program from start to
current status, but he gives much credit
to the active support and technical con-
tributions of the military services and
his associates in the company.

These people are using today's aircraft
equipment. They feel that the Prewitt
blade will play an important part in the
expanding role of the cockpit.



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Latest version of the winged target built by
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formance is expected with further develop-
ment.



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CARBIDE INSERT, at 2,000 F. in induction heater coil, is annealed and bent by Roehm-changed tool to proper angle.



END-MILL CUTTER of helical carbide rotates at 13,500 rpm. on a spit mill at Roehm.

Helical Cutters Are Formed Faster

A mechanical bender former developed by the Roehm-Angene Co. shapes helical carbide cutters which formerly had to be shaped by hand with losses of approximately 25%.

The bender former works inside the furnace of an electronic induction heater coil. With the best developed internally in the carbide itself by the auto waves from the heater, temperature of the carbide must be raised quickly to 2,000 F. and held there automatically while the insert is bent and twisted to fit the rotary tool body (specimen shown) forming.

Previous Methods: Before Roehm developed this method, the carbide had to be ground in a very slow heated using an electrolytic bath. The operator could only judge the temperature of the carbide by color and he had to avoid heating it above 2,100 F. because the carbide bender "bake out" above that temperature and deteriorates the carbide.

With one end of the bar as a vice, the other end would be gripped with a pair of pliers and gradually twisted the desired amount. Then the pliers were used again to bend the bar edgewise. Approximately 25% of the helical carbide inserts were ruined when made out of standard stock. By the method, either from incorrect bending or bending or from exceeding the temperature limit. Results were not uniform.

The carbide bar, when held obliquely within the rotary tool body, must be bent as well as twisted in the finished tool will make a flat cut. Otherwise its end would be "high" and the tool would make a cut which would be rounded-up in the middle.

Roehm was forced into this development because carbide manufacturers do not make inserts shaped to fit helical

tool bodies. Boring like the helical cutter, however, it cuts radial forces, requires less time for workpiece, less power and needs less maintenance than a straight-edge cutter.

Fast Cutter: The helical cutter is used in the machining of wing spars, fuselage stiffeners and other portions of jet bombers. A helical carbide cutter can make a 14-in. cut 70 ft. long in a wing stiffener, saving as much as \$625 in 10-14-in. in seven minutes, saving one trip through the mill, with a 100-microinch finish. This compares with 20 minutes required by a straight edge carbide cutter at 45 minutes by the old high-speed-steel helical steel cutter, and neither could hold the desired tolerances.

In another instance at Roehm, a van made of 4140 steel, heat treated to 110,000 to 200,000-psi strength was reinforced with a helical carbide submill cutter, removing some three 600 cu. in. of material on a confined surface, with a finish of 32 to 40 micro-inches. The cutter was run at a speed of 750 surface feet per minute while the tool was fed to the spot at the rate of two inches per minute. Until this cutter was developed, such a fine finish was virtually impossible on such a wide face cut.

Other Advantages: The helical cutter is less prone than a straight-edge because of the angle of the bite to which the cutting edge conforms, mostly 15 or 20 deg.

Although the helical cutter operates at speeds of 3,600 to 10,000 rpm., their tool life is about three times that of a straight-edge cutter.

After Roehm has done further research on the shaping of helical carbide cutters, it expects to have the reference tool over to carbide manufacturers.

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Hawthorne Aircraft Co. (40 ft.)

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Ryan Welds Giant External Tanks

Smooth cylinders with more than 30,000 electric spot welds possibly are destined for use on B-47s.

Ryan Aeronautical Co. is making what it claims are the largest external fuel tanks now in production. These giant aluminum alloy cylinders, possibly for the Boeing B-47 bomber, are finished to aerodynamic smoothness with more than 30,000 electric spot welds.

The company has had to dig deep into its machine welding know-how to get the best money on this job. Production was complicated by several factors:

- **Weight constraints.** By welding alone, was required.
- **Tanks were too big for standard welding equipment.**
- **Conventional cleaning compounds did not work satisfactorily with the special aluminum alloy.**
- **Welding Equipment—Giant tanks and spot welders, operated by two-man teams, were chosen to handle the jigsaw job. One man operates the machine, the other feeds the work feed.**

The work is moved by a Ryan devised system. Overhead materials load the tank sections on track-mounted steel dollies. The dollies track the sections to the welding machines.

The company's engineers have worked out a neat way of welding straight seams on the tapered end sections of the tanks. Rollers in the dollies rotate the sections while one of the team members yaws the sections by means of a hydraulic cylinder in each dolly.

The large Federal welders have a 60-

in thrust depth and run spot size welds per inch at the rate of 200 each minute. The equipment can melt a square of over 10,000 lb per in. while taking 120,000 ampere. Four pairs of these welders are used on the tank project.

• **Heat-Tight-Making leak-tight joints by welding is a critical job. Uniformity of the equipment is essential. Imperfections on the sheets being joined, or their improper cleaning, can change the welding resistance, resulting in poor welds or no joints in the metal.**

The cleaning problem was solved in



FEDERAL WELDERS, used on the giant fuel tanks, have deep 60-in. throat, can spot size welds per inch at a rate of 200 per min.

the Ryan development lab, with the production of Ryan 34, which rotates inside like from the alloy. Surface resistance of 10 to 15 milliohms is obtained, safely below Ryan's top limit of 50.

All sheets are welded within 24 hours of cleaning. In addition, X-ray and tensile tests are regularly made of sample welds. Each finished section is tested for leaks in special pits with 75 psi pressure.

• **Joint Construction—The tanks are single in design. No longitudinal members and very few bulkheads are used, according to Ryan.**

Conventional joints are closed with two rows of spot welds and one row of groove weld. Automatic Helium machines are used for fusion welding of the tough longitudinal seams which run through the cylindrical tank sections.

The seams are no thicker than the metal and does not require splice plates, according to the company.

The aluminum alloy used is a high-strength type of good ductility, with no cladding.

Props Get Hard Nickel Coating

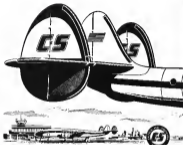
Hamilton Standard propeller blades have been successfully coated with nickel in a new process developed jointly by the Hamilton Standard division of United Aircraft Corp. and the Hamilton Standard Co., Inc., of Buffalo, N. Y.

Service use of the "Aqua-Clad" coated blades on the Martin P5M-1 and the Grumman UF-1 have conclusively demonstrated the protective ability of the coating, according to the sponsoring corporation.

• **Joint Development—The process, which has been the subject of two years' joint effort by Hamilton Standard and Bell for the Air Force and Navy, is claimed to give a stronger, hard and rustproof coating. A synthetic rubber compound developed by Hamilton Standard is used to bond the nickel plating to the aluminum.**

New's tests compared plated and unplated blades, the plated ones emerged unscathed, but the unplated blades were "seriously eroded." Tests at Hamilton Standard used high pressure water streams and caustic chemicals in conditions far more severe than expected to be encountered in service. The coated blades were unharmed, but the unplated blades lost about 20% of their top area.

• **G. R. Bart, president of Bell Labs, says the process combines the hardness and corrosion resistance of nickel with the advantages of aluminum. He said that the bond between the aqueous sys-**



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these base and the metal has extremely high tensile strength and will stand up under a wide range of temperatures.

Reed material is sprayed on, and then the blade is plated by the usual process. It takes about 24 hr. to process a component.

Finished parts have a Vicodin hardness of 800-950 and are ductile. Surface finish is, very bright and can be polished mechanically to a cleanliness.

Electronic Checker For Foundry Alloys

An electronic system of checking all alloy elements content in aluminum alloys in the furnace before casting has been introduced in Great Britain by T. J. Aluminums Ltd., Birmingham.

According to the company, it is possible to make an analysis for as many as 13 elements in less than four minutes, and the analytical work which usually takes an chemist one day can be done by five in one hour.

The new technique is based on an instrument known as the A. R. E. Radiation Control Quesometer, an electronically operated form of dust-reading spectrophotometer. It is fitted to a special lab in a corner of the foundry under controlled temperature and humidity.

Kaiser Plans New Aluminum Facilities

Some 5 million lb. of extruded aluminum aircraft parts will be turned out monthly at a new \$8 million aluminum extrusion plant which Kaiser Aluminum & Chemical Corp. will build for the Air Force at Dayton, Ohio.

Kaiser has signed a letter contract with the government to design and construct the plant, install machinery equipment and operate the entire facility under a lease arrangement. Cost of the plant does not include the two government extrusion presses.

Each 2 million lb. press, rated at 5,000 tons, will be ready half again as fast as in use in operation in the country. With normal loads, each press will be 210 ft. long, and capable of extruding stretched angles up to 140 ft. long and 2 ft. wide from aluminum billets weighing over 3,000 lb.

The \$10,000,000 plant will be constructed on a 13-acre site adjacent to the existing Hydro-Scope extrusion plant near Dayton.

Signing of the contract represents the company's second venture into the Air Force's current \$150-million "Task Force" program. The other is a \$17 million facility for two giant lagging presses at Newark, Ohio.

NACA Reports

► Effect of an Autopilot Sensitive to Yawing Velocity on the Lateral Stability of a Typical High-Speed Airplane (TN 2476—By Osborn B. Gates, Jr., and Leonard Stenfield)

One baggage of high-speed flight in current aircraft is lateral oscillation. In the transient and especially in steady flight, these oscillations are poorly damped. One way to improve damping is with automatic stabilization, the best type of autopilot for the job is one which applies radio control inputs sensitive to the yawing angular velocity. In flight tests of the Boeing X-57 such an autopilot did increase damping of the lateral oscillation.

This technical note is to determine the effects of such an autopilot on the lateral stability of a typical fighter airplane which has been designed for transient and especially, speed. Five flight conditions were investigated. Ladder at sea level, approach conditions at 12,000 ft. and cruise at 20,000 ft. at Mach numbers of 0.50 and 1.7.

The report concludes that the lateral oscillations damping should be satisfactory with the installation of the proposed equipment. As a matter of interest, calculations were made for a time lag in the autopilot of 0.10 sec. Such a lag had negligible effect on the calculated lateral stability of the airplane.

► A Procedure for Calculating the Development of Turbulent Boundary Layers Under the Influence of Adverse Pressure Gradients (TN 2476—By Kenneth F. Boland and Jerome P. Keenan)

The more you work with delta-function analysis the more you realize that it is a problem in calculating boundary layer development. In recent, the boundary layer is usually turbulent and less than half the span of the delta-function in thickness. A further complication is that although two-dimensional calculations exist, applications of these methods to the flow in conical diffusers have led to difficulty.

This technical note is a progress report on research aimed at evaluating a procedure which would be applicable to conical diffuser flow.

The procedure has been based on the boundary-layer equations and on an extended form of the momentum equation. In the development, two efforts were made: To determine the spatial rate at the physical quantities involved through an analytical procedure, and to achieve reasonable results of turbulent boundary-layer research.

Predicted and experimental results from several sources are compared for a number of cases of flow over flat plates.

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which is in close relation to the boundary layer flow. In the case of the boundary layer flow, agreement of calculated and experimental values was quite satisfactory. In some instances there was definite disagreement between calculated and experimental results, but the feeling is that these disagreements are not too significant.

The authors believe that good agreement has been obtained in enough instances to justify the continuation of effort along these particular lines.

• Theoretical investigation of Submerged Inlets at Low Speed (TN 2125) — by Alvin H. Sells and John R. Spang.

Among the many contributions to external aerodynamics made by the National Advisory Committee for Aeronautics, the submerged inlet problem is outstanding. Such an inlet, whose conditions do not project beyond those of the boundary, is one approach to the problem of getting air into a turbojet airplane. Applications of the inlet have also been made—they include engine inlets for the Lockheed F-80, the Ryan XF7R-1 and a variation of the Republic P-84.

Perhaps one of the reasons that the inlet has not been used more is that its design is sensitive to the geometry of the approach ramp, the inlet passage way leading to the duct entrance. The ramp is composed of a floor and two side walls.

The profile and plan-form design of the ramp is a basic problem in the further development of submerged inlets in general.

This report analyzes theoretically the importance of various design parameters and indicates (where possible) methods for calculating their effect on the overall performance of the submerged inlet. Inlets with parallel, divergent, and convergent ramp walls are considered and their fundamental differences discussed. The basic limitations of the report is that the analysis applies to low speeds, that is, the small incompressible flow theory has been used.

As a result of the analysis, the important inlet pressure loss in the entrance of a submerged inlet has been broken down into its components. And these can now be calculated subject of course, to the restrictions of the report.

The results show a qualitative picture of the flow conditions in the inlet just ahead of the duct entrance. There are two main sources of pressure loss in the entrance: flow boundary layer and static pressure of the vortex core. Formations are developed by the losses due to each of these sources.

Discussion of the effects of mass-flow ratio and compressibility on the aerodynamic performance

- The report concludes that:
 - Boundary-layer losses on the floor decrease with increasing mass-flow ratio.
 - Inlet vortex losses increase with increasing mass-flow ratio.
 - Therefore, there must be an optimum mass-flow ratio with minimum total losses in the inlet.
 - Therefore, there must also be an optimum divergence angle for a straight ramp which gives maximum inlet pressure losses.
 - Vortex pressure loss depends upon inlet geometry and local pressure coefficient, and to a lesser extent upon the mass-flow ratio.
 - Ramp boundary-layer losses are determined by the momentum thickness of the local pressure coefficient, and the boundary-layer shape parameter.

PRODUCTION BRIEFING

• **Aviation Associates, Inc., Ft. Worth, Avionics** makes, has added a 10,000 sq ft electrical subassembly and overhaul department to its new Ft. Worth factory to specialize in subassembly for aircraft hardware and other military construction. Company now is completing overhaul and reconditioning of 10,000 Y-29 superchargers for USAF.

• **Bowen Technical Refinishing, Inc., of Bowen, Inc., Carroll, Conn.**, has opened additional 5,000 sq ft of production facilities for interior set out of flight simulation chambers. Aircraft and electronic equipment are tested in these chambers under varying conditions of humidity and temperature.

• **Engineering Research Associates, Inc., St. Paul**, has moved USAF contracts for structural stress analysis and has leased 11,000 sq ft of additional area to accommodate the program.

• **Carl Henschman Co., Manhattan, Los Angeles and Milwaukee**, has been awarded exclusive U.S. representative for Ebon, S.A., Switzerland, maker of thread turning and shaving machines, second operation and precision measuring machines. Henschman has also been appointed agent for Technica, A. G., Switzerland, to handle its Type 1100 vertical slotting machine.

• **Lockheed Aircraft Corp., Burbank**, expects its Southern California plant force to rise to about 11,000 workers by next year, from 77,000 employed now. Separation force will increase from 4,000 to about 10,000. Company delivered list of 20 two-place T-33 jet trainers to RCAF.



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Plastic Foam In Control Surfaces

Plastic foam-filled control surfaces, possibly introduced for use in the long range Starliner guided missile, have been developed by Northrop Aircraft, Inc.

No external ribs are required with the new design, the number of rivets has been minimized, and surfaces can be built with greater strength for less weight than conventional designs.

The new Northrop process uses Styrofoam as a filler. It is a hard plus no foam developed from polystyrene by the Dow Chemical Corp.

► **Reasons**—Northrop engineers, headed by F. E. Pickett, had been considering the use of Styrofoam because of the potential weight saving and elimination of surface vibration. In this latter feature, the Styrofoam acts as a damper by filling the voids within control surfaces and removing the possibility of skin "oil-croaking," for example.

One of the keys to the successful use of Styrofoam was the development of an adhesive for bonding the plastic to metal. This adhesive permits the use of Styrofoam with wood, glass laminates, fabric, aluminum or other metals, says Northrop engineers.

In comparison with other metal oil croaking, Northrop's is finished or sprayed on, depending on surface use. If it is applied to all mating surfaces and sealed by pressure riveting.

A bag of PVA (polyvinyl alcohol) contains the pressure control between working surfaces. The bag is made large enough to cover the entire surface using the foam filler. A vacuum pump exhausts the air from inside the bag, and the pressure of bag against surface provides the force for sealing.

Laboratory processes have handled areas as large as 16 ft by 20 ft with this method.

► **Design Advantages**—Northrop says that use of the plastic foam is a substitute for rib ribs with weight up to 10% on control surfaces which are as much as 15% lighter. Strength is increased up to 10%. These comparisons are made with conventional built-up surface construction.

Working in metal, the gap and friction required for ribbed surfaces are largely eliminated. This, too, further manufacturing economies which result from reducing the number of rivets.

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STYROFOAM FILLER eliminates vibration in control surfaces. Its use cuts weight, eliminates internal ribs, reduces number of rivets. Most of the plastic has clamped the simple pond there.

Northrop's patent engineers find that the continuous bonding of the Styrofoam surfaces under stress can actually strengthen than ribbed surfaces of comparable size. One typical surface, designed to a load factor of 1.5 was to a factor of better than 3.0 in lab tests. In attempting to test to destruction, failure occurred in one of the test stand fittings and the surface could not be destroyed at that time, Northrop pointed out.

► **Application**—The latest advantages of foam-filled surfaces—weight saving, strength improvement, manufacturing economy, freedom from vibration—point to their use in high-speed aircraft. Features of the technique developed by Northrop show them to be of constant chord, a type of surface not in use on Northrop's current production project, the F-50 Scorpion.

These surfaces could be test specimens, made with constant chord for many designs. But they could also be representative of future practice for more advanced types of Northrop aircraft, such as the sleek profiled missile.

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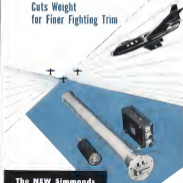
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An aerial photograph of a vast industrial facility, likely an aircraft manufacturing plant, with numerous hangars and buildings. A large, stylized white 'R' is superimposed over the center of the image, partially enclosed by a white circle. In the upper right corner, several aircraft are shown in flight, leaving white smoke trails.

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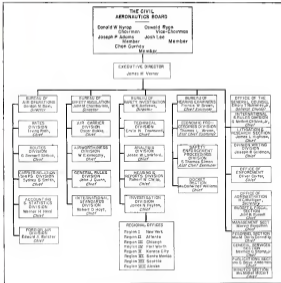
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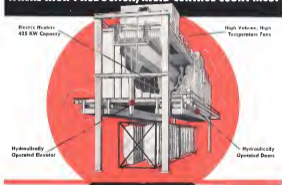
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 SOURCE: IAT4, Aviation Week, 8-8-88

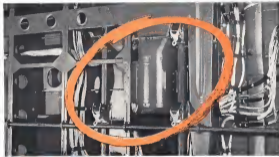
Washington Reps

Following is the list of new electors/representatives located in Washington.

- [illegible]

FIFTIETH ANNIVERSARY

DESPATCH
OVEN COMPANY



JOY AXIVANE® AIRCRAFT FANS provide ice-protection for Parked Packets

The Fairchild Packet must be ready at all times to carry airborne troops or supplies to forward areas. The wings of parked aircraft, however, sometimes become coated with ice or frost which may literally stop them cold. To minimize this possibility, Fairchild engineers designed a forced intake system for wing-packet de-icing while the plane is on the ground. Two JOY AXIVANE Aircraft Fans supply combustion and venting air to eight ducted RTU heaters. The heated air can be valved either into the wing panels or into the cargo and cabin space. No space is wasted by the fans, since their compact size permits them to be installed between the vertical fuselage frames.

Each of these highly efficient 3.5 H.P. fans produces 1100 C.F.M. at 5.5" static pressure, yet weighs only 22 pounds and is only 3" in diameter. A & N design specifications. Superior features of all Joy Aircraft Fans are compact design, shock-resistant strength, minimum operating noise, and the most favorable air volume-to-weight and efficiency-to-size power ratios.

• Joy designs and builds each fan to the exact requirements for which it is intended. Each fan, therefore, is custom engineered for highest efficiency. But since numerous work fans can be applied from the extensive Joy already designed, both single and two-stage units require. Operational features include straight or flared intake, flared or flanged construction, radial intake filters, acceleration, and cooled intakes where required.

Here are some of the many uses for Joy AXIVANE Aircraft Fans: Windshield de-icing, windshield air wing de-icing, cabin heating, cabin ventilating, cockpit heating, sealing radio and electronic equipment, cooling voltage regulators, oil cooling, gear-box cooling, instrument cooling, air recirculation, and high-altitude pressurizer heating.

Write for Bulletin, or

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Over 100 Years of Engineering Leadership

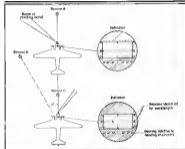
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AVIONICS



RELATIVE LOCATION of beacon blips on scope determines plane's position

Low-Power Beacons for Navigation

Australian microwave system plots several stations to fix position; can be used for marking obstacles.

(McGraw-Hill World News)

McBeacon-A microwave navigation system, using low-power quasistatic-wave ground beacons, operating at fixed points in the 3.2-cm band, has been developed in Australia and successfully flight tested by scientists of the Radio-physics Division of the Commonwealth Scientific and Industrial Research organization.

The system is applicable to route navigation, aircraft routing, and to assisting the pilot in holding procedures near airports. Its operation in the microwave region is used to allow the advantage of freedom from radio interference, and its design permits the use of several simultaneous beacon transmissions.

Current development models have ranges of 50 to 100 miles, line-of-sight operating with performance virtually independent of weather conditions.

►Visual Data-The system's navigational information is provided to the pilot on a 3-inch panel-mounted cathode ray tube. Each of the several beacons within range appears as the familiar "blip" whose horizontal position on the scope either side of center represents that beacon's azimuth

position relative to the aircraft's heading. The identity of each of the several beacons is established for the pilot by the vertical position of its "blip" on the scope.

The number of beacons which can be generated simultaneously at one band setting is limited by the frequency

bandwidth available. The "blip" size on the display permits easy resolution of position by an observer and because of its large magnifying external scaling points—10 mils for scale of its azimuth—10 mils and allows great detail.



OMNIDIRECTIONAL microwave ground beacons has up to 100 mi. range

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☐ Welder ☐ Chief Welder ☐ Chief Welder
☐ Welder ☐ Chief Welder ☐ Chief Welder
☐ Welder ☐ Chief Welder ☐ Chief Welder



AIRCRAFT used with core stream.

work of the receiver (30 sec. for the experimental receiver), and by the frequency stability of the individual stations. With present equipment, a spacing of 7.5 sec. is adequate, as it permits the use of five simultaneous beacon presentations.

Beacon signals are received by a narrow beam rotating antenna mounted in the nose of the aircraft, capable of swiveling through 180 degrees in azimuth for frontal coverage. The antenna has 90-deg vertical coverage from horizontal down to the nose.

From the presentation of a single beacon on the scope, the pilot can determine the bearing of a known point relative to his aircraft. Two or more beacons will define a straight track for the pilot. Flight tests have shown system malfunction errors of two degrees maximum when bearing on a single beacon.

Water Cooler

- New J&H alternator uses vaporization cooling.
- This helps to maintain high-altitude output.

The sight of drain pouring out of a new aircraft alternator designed by Jack & Henry is no cause for alarm. The new J&H alternator uses water vaporization cooling to prevent alternator power output from falling off sharply at high altitudes and ambient temperatures, a shortcoming of conventional ambient cooled alternators.

Because a generator's power output is largely determined by its internal temperature, cooling at high altitude as demand and highest ambient temperatures is a major problem.

By using vaporization cooling in their new G75 alternator, J&H say, the new circuit will not drop below 35,000 ft. where conventional ambient cooled alternator ratings begin to falter. The

small weight of the vaporization-cooled unit is less than that of its air-cooled counterpart of comparable rating.

► **How It Works**—Distilled water flows in internal thermally insulated reservoir is injected into the alternator's hollow shaft. Centrifugal force then carries the water through specially placed orifices onto the machine's internal air faces. These water pads up heat, evaporates (thus cooling the machine), and is then exhausted as steam.

A thermostat in the alternator senses ambient temperature and operates a bellows valve to control the flow of cooling water. Since all cooling is accomplished by vaporization, the alternator can be insulated from ambient ambient temperature, which under some flight conditions can be much higher than internal machine temperature.

► **Design Details**—The G75 is a 5-hp, 230/115 volt, 400-cycle, 12,600 rpm alternator rated at 12 kw, 80% power factor. By adjusting water cooling water, the manufacturer says, the G75 can deliver 16 kw and still maintain satisfactory cooling.



VAPORIZATION COOLED alternators rated output at new Jack & Henry G75 alternator at altitudes above 35,000 ft.

At its rated output of 12 kw, the unit has an efficiency said to be about 65% and uses about 34 lb of cooling water per hr.

► **Weight Comparison**—It isn't easy to make a direct weight comparison of the new G75 with an air-cooled machine of comparable rating because of the weight of internal plumbing, water reservoir and the cooling water. The weight of the water will depend on the length of aircraft engine and average power demands made on the alternator. Both are difficult to predict.

The G75 was developed for a North American aircraft, made as which NAA is handling the reservoir and plumbing. Weight of these was not disclosed. Now J&H provide a weight estimate of external plumbing that would be required for a pilot's aircraft installation.

► **An Estimate**—Comparison of the 35

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For the best weld on this beam for landing gear column, the parts are preheated by the induction coil shown. Electrician divides is connected to main as first welding contact pressure unit work is completed in proper temperature.

THE CLEVELAND PNEUMATIC TOOL COMPANY

CLEVELAND 5, OHIO

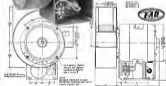
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In GTE, however, with a standard 3601 air-cooled alternator of 15-kva rating, weighing about 50 lb, allows an 11-lb differential for water, meaning that the weight of external plumbing in the case of the weight of air during for the air-cooled machine. On the basis of an average power consumption of 12 kw (50% of a 15-kva rating) during a mission, it appears that the new GTE is lighter than its air-cooled competitor for missions up to 75 hr.

For longer missions, added water weight forces the air-cooled machine under the heaviest assumptions. However, this estimate is based on both machines operating below 55,000 ft altitude where the air-cooled machine is not derated. At higher altitudes, the new water-cooled machine should compare even more favorably.

An interesting by-product of the new cooling technique is that the presence of moisture in the machine increases break life because of the lubricating effect of the steam.



Tiny Transformers

A new line of miniature, hermetically sealed low-frequency transformers and reactors has been announced by Southwestern Industrial Electronics Co.

The units are available in input, center-tap, and output type transformers, as well as reactors, and have extremely high inductance for their size, the manufacturer claims.

Other features, according to SIE include two-coil, front-backing construction, shielding at -90 db, as much, and close tolerances on electrical and mechanical characteristics. Standard units are available with $\pm 5\%$ tolerance across special units to within $\pm 1\%$.

Southwestern Industrial Electronics Co., 2812 Post Oak Road, Houston, Tex.



The engineering department that consistently produces the "best" of the right time—R-3, F-1, F-4, now the F-35 Delta jet series, A-1, F-15, F-16, F-18, F-19, F-20, F-21, F-22, F-23, F-24, F-25—often engineers a real opportunity to become a part of the advance team that is designing today for tomorrow and the future of aviation. Because a part of the contracting aircraft engineering group in the aircraft industry by writing for complete information on career opportunities at North American. From studies a summary of your education, background and experience.

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Weltronic three phase frequency converter controls are available for all types of seam and spot welding operations.

Weltronic converters are in operation in a number of major aircraft plants.

Complete information will be provided on request.

Weltronic Co. 19500 W. 8 MILE RD. Detroit 19, Michigan

EQUIPMENT



NARCO'S 40 engine test set about 300 VHF Omni sets is made at Axtell, Pa.

Narco Shows Low-Cost DME Set

New lightweight unit is aimed at the corporate plane market and is expected to make flying easier and safer.

By Scott H. Reiniger

Axtell, Pa.—A low-cost, lightweight DME set, developed under CAA contract for private and corporate aircraft, has been unveiled here by the National Aeronautics Radio Corp. (Narco).

Distance measuring equipment is an important step in making navigation safer and simpler. The new low-cost set, to be available only next year, should bring private flying a step closer to the average man.

■**Visual Edge**—The equipment may be called a road sign of the air. It has a unique window on the instrument panel to show the pilot accurately, at any time, how far he is from his destination or a selected station. The display is the output is simple.

The set Narco demonstrated was only one of the company's experimental design. It is too early to tell price, but the firm is confident it will cost less when it reaches the market than any other set. As an early owner, the company should have a wide open market to exploit in the small plane field.

The set is remote-controlled. There is no tinkering with DME frequencies. There is only one knob for the pilot. He uses it to select the identification frequency of the ground measuring

station he is measuring from. In doing this, he automatically selects the proper DME frequency.

The set takes less space on the instrument panel than some of Narco's glove-box-size VHF omni. But, at 25 lbs., it is heavier. While it can be used in smaller single engine planes, Narco believes its strongest market, at the moment, will be two-engine corporate aircraft where there is greater tolerance for weight and costs.

■**First Step**—Development of the low cost DME is the first move in a program by the firm to produce a greater variety of products and to introduce



DME includes frequency selector (top) and distance indicator (left, bottom).

these to a wider market—toward better corporate aircraft and airline planes.

Narco thinks a low price DME will have strong appeal to standard and smaller scheduled airlines and feels a compromise to cost and performance can be reached with these objectives.

■**How It Works**—The equipment operates something like a radio showing, telling distance by frequency, order basis to the selected measuring station and measuring the time it takes there to answer back.

Toward the low end of the scale on the analog indicator, the set is accurate within a mile. At the high end, it is accurate within five miles, the company says. Overall operation "meets CAA requirements for a good side step," according to Jim Rialdi, Narco's president and former Radio Corporation of America man.

Operating in the ultra high frequency band, the set is a monosonic type consisting of five components—the DME receiver, engine unit, DME transmitter, distance indicator, frequency selector and power supply. Receiver unit, transceiver and power supply are consolidated as one compact box. The indicator and frequency selector are mounted on the instrument panel for the pilot.

The set goes with a set of not over 25 lbs. The transmitter has ten channels each broken into ten codes giving 100 signal frequencies for DME service. Frequency, code and identification are controlled automatically.

The equipment is all-electronic—its only moving part is the needle. It does not vibrate. The radio is crystal controlled.

■**Now Superb**—As a comparison piece for the multi-plane market, an economy VHF set was exhibited for the first time for firms who can't make a time capital outlay. It costs \$445.

The set was developed by Narco after several years of field experience with an Oshkosh, which the new set, the Superbaser, will replace on the production line.

Narco insists on the fact the Superbaser is the "best complete instrument of early low-cost aircraft made from the low frequency to the very high frequency radio." Some shortcomings in earlier sets, dictated by the low price limitation, have been corrected in the new set by several engineering developments, the report.

To Rialdi, the Superbaser is "a new VHF system intended to meet VFR visual flight rules rather than IFR cross country flight rules. It gives pilots the controls for VHF cross country and navigation. These are: Power channel VHF transmitter, variable VHF communication-reception, receiver, 100-127 mhz, left-right indicator (on off course needle), before indicator and receiver course selector. No



OMNIGATOR is Narco VFR standby unit.

ILS (instrument landing system) built-in are included.

A single 10 lb. box contains all main portions of the set and can be mounted on the instrument panel.

The company claims the improvements over the Oshkosh are:

- More accurate course selection with new, lower scale showing leading to wide spaced accuracies. Vector control permits exact settings.
- Double noise barrier circuit added to reduce engine interference. All circuits have been revamped and improved.
- Improved test for recovery.
- More rugged construction, long-life tubes.

The Superbaser costs considerably less than the company's de luxe VHF set, the Omnigator, used in many com-



SUPERBASER is economy set for VFR.

mercial and private pilots operated by "left-hand" pilots who must fly in instrument weather.

The Omnigator has an eight-channel transceiver with a 3 s. output limit, priced by one way for the hour priced set, a variable VHF receiver, identification communication and navigation frequency, and facilities for receiving VFR, 75 mhz, radio beacon and ILS beacon signals. These are combined in an 18 lb. box. The set is priced at \$795.

Of about 3,100 planes equipped with low-cost VFR Omni, more than half are models produced by Narco, the company claims. The firm has no sales or refinery business. Until now it has stood at the small-plane field—producing the lowest price VHF Omni

on the market. Narco says. Sales have risen steadily through 1964, driven by the Nightglow market, production levels have been held steady. Narco's last year's output has about 50 airplanes producing, on the average about 100 sets each month for gross monthly sales of \$55,000.

German Airports Get VOR Equipment

(McGraw-Hill World News)

Frankfurt-Main, VOR stations are scheduled to be set up at the West German airports of Frankfurt, Munich, Nuremberg, Düsseldorf, West and Dornburg during the next three months.

This decision was made by the high commissioner's Civil Aviation division after successful tests of VOR equipment at Stuttgart-Heidenheim airport last spring.

The new equipment will supplement present leading and navigation aids.

Because of its heavy air traffic, Frankfurt's Rhein Main Airport will be equipped with two VOR instruments. The equipment was manufactured by the West Berlin firm of C. Lorenz A. G. with funds from the German federal government.



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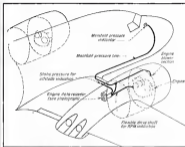
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Giannini



MECHOGRAFE engine data recorder (lower center right of diagram), as it is installed in a Swiss Conquest 240. The unit is manufactured by Favre, Bern, Switzerland.

Swiss Unit Gives Check on Engine

Details of a Swiss Engine Data Recorder have been applied to American West by Swissair's chief engineer, A. O. Balmann.

The instrument, first tested in a DC-3 aircraft, records manifold pressure, rpm, and pressure, altitude in a function of time.

The recording is registered on a 24-in wide roll of wax paper whose length permits 60 hr. of operation. The recorder is manufactured by Favre, Bern, Switzerland. Name is Mechograph, Patent RU 244.

Balmann says the recorder has been "of great help to our engineering personnel to investigate engine or propeller malfunctions, to gather statistical data for performance analysis or to study new engine operating procedures."

The instrument has been used also to make numerous studies concerning Conquest 240 engine operation. Diagram at the top of the page indicates how the unit is installed in the Conquest.

In addition to providing a permanent record of manifold pressure, rpm, and pressure altitude, Swissair cites these advantages for the Mechograph:

• Periodic analysis of engine power and time limits under such variables as take-off, climb and cruise (outside air temperature is obtained from flight log).

• Evaluation of rate of climb or rate of descent (altitude differential versus time) at various altitudes.

• Determination of total flight time and/or engine time including taxiing and warm-up time.



DATA RECORDER shown mounted in operation. It was tested out in a DC-3.

At last Feb's Champion Sport, Plan and Aviation Cookbooks, held at Toronto, British Empire Airways spoke favorably of the instrument, saying that "among other benefits, the records show whether errors follow prescribed procedures."

Johannesburg Ready for Comet

(McGraw-Hill World News)

Johannesburg-Work has been completed on a main runway at Jan Smuts Airport near here outside of taking the DH Comet and permitting the jet transport to take off fully loaded from this field which is 6,000 ft. above sea level.

The main strip is 10,500 ft. long.

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200 ft wide and can take almost wheel loads of 155,000 lb. Two railway monorails are being put in, 8,250 ft long and 200 ft wide.

San Diego Airport covers some 2,110 acres and has cost approximately \$10 million so far, with final expenditures estimated at over \$17 million.



SEAMLESS STEEL flexible hose is joined to manifold with new end coupling.

Coupling for Stainless Hose Saves Weight

A development which reportedly overcomes a major production headache in producing aircraft type stainless steel flexible hose and saves considerable weight on engine hose installations and other aerospace applications has been announced by the Avco Corp.

It is a specially designed hose end coupling which is mechanically attached rather than brazed or welded to the ends. The new coupling overcomes "one of the greatest problems today in hose manufacturing, which is high-temperature brazing or welding of very thin-walled flexible stainless steel hose to metal elbows and couplings," Avco says. Weight is saved by mechanical joining, since lighter metals, like aluminum alloy or titanium alloy, can be used.

The coupling can be detached from the hose end freely. Yet they provide a tight and under high pressure.

The plastic shows how they can be used to join flexible stainless steel hose to rigid tubing. Equipment shown is an all-steel hose overfill device labeled by the firm. The manifold is subjected to pressures up to 1,500 psi. A rigid saddle on the rigid tubing provides a means for attaching the flexible hose.

Avco specialists in design and stress fracture of custom tubing for high performance applications in military and commercial aircraft. Avco Corp., Reading, Pa. 1.

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NEW AVIATION PRODUCTS



Servo Valve

A single-stage hydraulic servo valve for high-pressure power drive systems has been developed by Midwestern Geophysical Laboratories.

A long-stroke type, the servo valve can be attached directly to the load actuator, producing a complete transmission line of hydraulic lines from the valve to the load. This unit is designed for 200- to 3,000 psi pressure and weighs 5 lb.

Body and piston are hardened, yet contain tapered steel, designed to resist against scoring and loading under dirty oil conditions, and changing valve characteristics under varying temperature conditions.

Midwestern Geophysical Laboratories, Tulsa, Okla.



Current for Planes

A new line of current transformers for frequency changes designed to convert 60-cycle current into a 400-cycle power source accurate enough for aircraft and engine test work has been placed on the aviation equipment counter by Magnet Controls Corp.

The units, at 3, 5, 7, and 10 lb. units, can be used for measuring test currents, functional testing of radio and radar controls, instrumented, for supplying power to control systems of missiles and rockets, and for any similar operations where 400 cycle current is needed.

Output load of the equipment is made affected by voltage fluctuations in the incoming power supply network using the company's Regulation of

AEROTE PRESSURE SWITCHES

HELP MAKE TODAY'S AIRCRAFT Safer Than Ever!

Greater safety for your planes is the goal of every Aerotec designed control. To cover every possible contingency, our instrument specialists have developed hundreds of different types of controls. Below are a few typical examples of Aerotec pressure switches covering a host of applications. Aerotec is supplying thousands of controls of these types to meet today's demands. They are playing an important part in raising the high standards of safety on commercial and military aircraft.



**SENSITIVE LOW PRESSURE SWITCH
SERIES P904**
Deflection Type for Ram Air
Sensitivity: 1/2" H₂O
Actuating Pressure Range: 150" H₂O to 3 psi with differential of 20% of applied pressure
Electrical Rating: 35 VDC 5 Amp, induction Coupling with A.E. environmental specifications 11405-35
For stall and flap warning applications and as safety switch for cabin de-icing system.



**HIGH PRESSURE SWITCHES
SERIES 1100**
Actuating Pressure Range: 300 psi to 5000 psi
Mechanism: MIL. Parts, see Hydraulic Rules
Electrical Rating: 35 VDC 5 Amp. to 40,000 psi
Temperature Range: -55° F. to +150° F.
Proof Pressure up to 7500 psi

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output voltage is within 5%, while frequency regulation is within 5% at 400 cycles, no load to full load. Wave shape distortion is less than 5% and the capacity.

Conspicuously designed, the units are of free-benzing (but) construction with the rotor sides, rotor assembly, and revolving field mounted on a solid steel shaft, dynamically balanced for quiet operation. The rotor top on the unit houses all controls.

Stalwart Generator Corp., Hobart Bros. Atlanta, W. Va. 26002, Tenn., Ohio.

Fire-Resistant Plastic

Flame-resistant laminated plastic suitable for circuit breakers and other switch equipment have been developed by Synthene Corp. The flame-resistant feature is available in both twin and in all standard grades and forms of Synthene plastic, says the company.

Synthene Corp., Oak, Pa.



Victory motor pump

Long-Life Pumps

These new hydraulic pumps for aircraft, built to last 40% longer than previous models and to reduce maintenance problems, have been placed in production by Vickers, Inc.

The pumps, designated PFAL, PFAS-2, and PFAS-3, are fixed displacement piston type designed for 1,000 psi hydraulic systems. They meet the 2- and 3-gal. per minute requirements of ANP-115 (at 1,500 rpm) and already have been stamped with the seal of military approval, Vickers reports. One of the pumps, PFAS-2, has the same capacity as an old standby in marine and military planes, the PF17 500 1.52.

A feature of the pumps is their small size and "extremely" high horsepower to weight ratio at rated performance. The PFAL generates 1.9 hp. per pound of weight. As these piston pumps are fixed-displacement types, delivery is constant at a given drive speed, and

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(CONTINUED)

AIR TRANSPORT

Final Mail Rates Near for All Trunklines

- Board "guarantee" under temporary setup is gone.
- But carriers can ask for rate hike in bad times.

By next month CAB hopes every trunk airline and mail boss will have a "final" mail rate.

That final rate means every dollar earned after taxes will belong to the stockholders. CAB has no longer take back post profits so it did under the "temporary rate" structure. But under the final rate rate system an airline need not go on losing money in bad times. It can still ask CAB for a raise.

This step, therefore, might look like having your cake and eating it, too. But it's not that easy. The Board intends to be tough on airlines that try to use the system in a perverse way.

In the now-departing era of "temporary" mail rates, CAB really made guaranteed a "last" (75%) setup on investment. Only last year, for instance, the Board granted Northwest Airlines several million dollars of retroactive mail pay on its domestic system. That was to lead it out of what looked then like imminent bankruptcy. The Board claims it doesn't plan to do that again.

▶ **Not Retroactive**—If an airline bankrupt now, CAB may raise its mail payment retroactively.

From now on, the airline gets what it can on its final rate. It earnings dip, it can "challenge" its existing rate and ask for a raise. If the Board agrees, it may grant some money—but it's only retroactive to the date of the airline's challenge.

Here's how domestic and international rates stood up last week on final and temporary rates.

- **Trunkline final rates:** American, Braniff (Post Office contracting), Capital, Chicago & Southern, Colonial (has challenged the present rate), Continental, Delta, Eastern, National (approved), TWA, United and Western (approved).
- **Trunkline temporary rates:** Mid-Continent, Northwest and Northwest.
- **Excluded:** All three major territorial carriers last final rates—Canadian Air, Airborne, Hawaiian and TWA.
- **International final rates:** Colonial Airways, China & Southern, PanAm, Alaska and PanAm Pacific are already on final rates.
- **International temporary rates:** Pan

Mail Pay for Domestic Airlines

Present and future mail rates of domestic trunklines and local service airlines as given in the complete listing, with effective dates. Actual yield during calendar 1951 are shown in the last two columns. Present and future rates are final, unless otherwise indicated by footnotes

Trunklines

	NEW RATE		PRESENT RATE		1951 FIELD	
	Cents per 100 wt.	Effective date	Cents per 100 wt.	Effective date	Cents per 100 wt.	Mail pay received 1951
American	—	—	45	1-1-52	45	15,100
Braniff	—	—	45	1-1-52	45	1,100
Capital	—	—	45	1-1-52	45	2,100
Chicago & Southern	—	—	45	1-1-52	45	2,100
Colonial	—	—	45	1-1-52	45	1,100
Continental	—	—	45	1-1-52	45	1,100
Delta	—	—	45	1-1-52	45	1,100
Eastern	—	—	45	1-1-52	45	1,100
National	—	—	45	1-1-52	45	1,100
Northwest	—	—	45	1-1-52	45	1,100
PanAm	—	—	45	1-1-52	45	1,100
PanAm Alaska	—	—	45	1-1-52	45	1,100
PanAm Pacific	—	—	45	1-1-52	45	1,100
TWA	—	—	45	1-1-52	45	1,100
United	—	—	45	1-1-52	45	1,100
Western	—	—	45	1-1-52	45	1,100
Mid-Continent	—	—	45	1-1-52	45	1,100
Northwest	—	—	45	1-1-52	45	1,100
Southwest	—	—	45	1-1-52	45	1,100
Western	—	—	45	1-1-52	45	1,100
Alaska Airlines	—	—	45	1-1-52	45	1,100
Alaska Pacific	—	—	45	1-1-52	45	1,100
Alaska Western	—	—	45	1-1-52	45	1,100
Alaska Eastern	—	—	45	1-1-52	45	1,100
Alaska Southern	—	—	45	1-1-52	45	1,100
Alaska Northern	—	—	45	1-1-52	45	1,100
Alaska Central	—	—	45	1-1-52	45	1,100
Alaska Western	—	—	45	1-1-52	45	1,100
Alaska Eastern	—	—	45	1-1-52	45	1,100
Alaska Southern	—	—	45	1-1-52	45	1,100
Alaska Northern	—	—	45	1-1-52	45	1,100
Alaska Central	—	—	45	1-1-52	45	1,100
Alaska Western	—	—	45	1-1-52	45	1,100
Alaska Eastern	—	—	45	1-1-52	45	1,100
Alaska Southern	—	—	45	1-1-52	45	1,100
Alaska Northern	—	—	45	1-1-52	45	1,100
Alaska Central	—	—	45	1-1-52	45	1,100
Alaska Western	—	—	45	1-1-52	45	1,100
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Alaska Southern	—	—	45	1-1-52	45	1,100
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Alaska Central	—	—	45	1-1-52	45	1,100
Alaska Western	—	—	45	1-1-52	45	1,100
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Alaska Southern	—	—	45	1-1-52	45	1,100
Alaska Northern	—	—	45	1-1-52	45	1,100
Alaska Central	—	—	45	1-1-52	45	1,100
Alaska Western	—	—	45	1-1-52	45	1,100
Alaska Eastern	—	—	45	1-1-52	45	1,100
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Alaska Central	—	—	45	1-1-52	45	1,100
Alaska Western	—	—	45	1-1-52	45	1,100
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Alaska Eastern	—	—	45	1-1-52	45	1,100
Alaska Southern	—	—	45	1-1-52	45	1,100
Alaska Northern	—	—	45	1-1-52	45	1,100
Alaska Central	—	—	45	1-1-52	45	1,100
Alaska Western	—	—	45	1-1-52	45	1,100
Alaska Eastern	—	—				

Airline Incomes

Net operating income (before income taxes and other adjustments) of trunk and local airlines for calendar 1953:

American	\$29,738,572
Aviation	2,574,581
Captain	3,709,145
CRJ	916,676
Gulf	(29,477)
Continental	793,887
Delta	6,675,631
Eastern	19,462,431
Inland	30,236
Midwest	518,799
National	5,442,227
Norfolk	38,428
Norfolk	2,252,583
TWA	11,475,468
United	39,810,363
Western	2,291,363
All-American	124,728
Boeing	(1,751,122)
Central	(184,679)
Empire	54,293
Florence	(54,773)
La Crosse	(137,498)
Midwest	(124,967)
Midwest	10,658
North	(135,423)
Pacific	241,895
Pacific	23,544
Reynolds	666,945
Seafair	(132,988)
Seafair	35,609
Time/Time	28,307
West Coast	(144,112)
Wiggins	10,383
Winn	(16,574)

ing heavily on road schedules. Therefore, an airline might ask a rate the first month that earnings outlook slipped below a 7% return on assets basis. That would "re-open" the final rate in at that date. This could in effect reduce the severity of the old temporary rate structure.

Paid Plus-CAR and its rate making staff look at the final rate's percentage, incentive side. They figure an airline will work harder to cut costs when it can count on keeping the profits. And Rate Division Chief Irving Kahn says the Board will follow on any airline that comes making it for itself only because it's had one bad month.

This year's first quarter has been the best and best of four first quarter stand-up year earnings. Long Expressions Ltd. led losses dropped by March the big airlines were showing for a free income-not road rate increase. But Columbia and a few local lines have more challenges than others, since they depend heavily on mail pay.

The big lines get 31-34 percent free increase but month, and most of them say the earnings outlook now is

improving on road schedules. Therefore, an airline might ask a rate the first month that earnings outlook slipped below a 7% return on assets basis. That would "re-open" the final rate in at that date.

• **Captain's Case-In** between the big and little lines are a few hundred cases. The Captain's case has been with some work under. Columbia has indicated to the Board that if it didn't beat the \$1 fee increase, it might have challenged its final mail rate. This would have been the first case to date where a big line got in trouble on its final mail rate. But it didn't happen. Captain's case has been with some work under. Columbia has indicated to the Board that if it didn't beat the \$1 fee increase, it might have challenged its final mail rate. This would have been the first case to date where a big line got in trouble on its final mail rate. But it didn't happen.

And the CAB rate-making staff is hopeful about next trends. So the newly established final mail rate structure may have weathered its first storm. The rates have stayed flat some for over a year.

Most airline earnings reported from now on are going to be flat, except for major tax and other adjustments that they're regardless of life pending before Congress. In airports, which are competing with a few. Subsidy agencies, which are at it, could, need not change the total revenues.

And the airline now getting and on a historic basis are theoretically free of subsidy anyway. When CAB starts setting an airline's mail pay at a two mile rate it means the Board agrees that is the "competitive" rate-the cost of handling and carrying each ton-mile of mail on that airline system.

Severely paid rates are paid on a severe price-rate basis on domestic routes and available air-mile basis on international routes. That is because the mail pay is a subsidy for flight to permit, without need to mail service. • **National's Final Rate-In** its 53-cent tentative decision setting a final 55-cent rate for National Airlines, CAB illustrates the basic difference between final and temporary rates. National had asked the Board to make the 53-cent rate attractive to but July 1 instead of only to that Jan. 1. But the Board decision indicated National's 53-cent temporary rate July 1 instead of only to that Jan. 1. But the Board decision indicated National's 53-cent temporary rate July 1 instead of only to that Jan. 1. But the Board decision indicated National's 53-cent temporary rate July 1 instead of only to that Jan. 1.

Then, the Board now has set the same final rate for National this year that it set last year. National can keep the profits it made last year on temporary rates, but it can keep them from Jan. 1, 1952.

In the National decision, the Board also tried to clarify the difference between what it will pay a separate rate for an international route at a domestic domestic airline. To get a separate rate for an international route, CAB said, it must be big relative to the domestic route, or big of mail that it already carries special equipment, and "cost to be" independent of the domestic system.

National's Hawaii route doesn't meet these standards, it's really part of the domestic system, CAB said, and its decision included an National's new overall 53-cent per mile rate.

ATA's Low-Cost Omnirange Unit

International carriers primarily interested in new terminal facilities for local service airports.

An Transport Asia Industries have developed a low-cost \$15,000-\$17,500 international aircraft facility. Many airlines already plan to buy or build it themselves for instrument approach and navigation in areas now lacking more expensive modern equipment.

But they haven't had time yet to negotiate any contracts. Interested manufacturers include Collins, Federal, Maryland Electronics and Waco Electronics Co.

• **Prototype in Use**-International airlines have expressed interest in the use of it, although ATA engineers stated the project primarily for local service airports. For American wants terminal equipment for Monterey, La Brea and other out-of-the-way airports, especially tropical areas where low-frequency radio performance is poor.

ATA's prototype has been in test operation at Baltimore's Friendship Airport since January. Ground tests indi-

cate its new instrument design makes it more accurate than any other omnirange equipment in use.

Yet its ATA-estimated production and installation cost is only \$5,000 to \$7,500, compared to \$14,000 each CAA is paying Maryland Electronics for a 42 ft. CAA-approved test omnirange unit.

• **Single Design**-CAA difference is mainly in CAA specifications calling for 24-in. dia. indicator face and elaborate continuous monitoring, a CAA spokesman says.

However, ATA technicians say the simpler ATA model has comparable dependability designed into it. Major component cost differences between the two models lie in such items as a \$400 indicator unit, \$4,000 and \$100 indicator unit, perhaps \$4,000. The new, more accurate \$1,100 ATA antenna, however, costs more than the antenna ordered by CAA in 1952.

American Declares Early 1952 Dividend

American Airlines' load factor is improving, especially this spring, but it is at a lower level than a year ago.

Despite the uncertain outlook, American's board of directors on Apr. 15 declared a 25-cent dividend, payable to common stockholders of record May 5. Timing of the declaration indicates to some observers that the directors are setting a dividend pattern that will permit paying either 75 cents this year or perhaps the same 50 cents in last year, depending on business developments. Last year's first 25-cent dividend was paid in June 1.

American's situation is significant because its security situation often is a topic of industry talks.

Here's how American is doing as compared with a year ago, based on data, 12-city sample of its service load factor:

	1952	1951	% Points
Jan.	65%	75%	down 4
Feb.	64%	74%	down 3
Mar.	64%	73%	down 5
Apr. (10 days)	73%	79%	down 6

American's total business volume is up, but the load factor is down because it has increased its fleet. American added 17 DC-6Bs last year. Available service isn't up that much, but the winter and spring business weather and the New York Airport situation have lowered the company's operating factor significantly.

In its last late in March ending CAB to increase fares, American estimated its first quarter net profit at \$638,680, compared with \$2,815,000 a year ago. Revenues were estimated at \$39 million as against \$34 million a year ago.

However, the picture apparently improved late in the quarter. American now reports its stockholders a net profit of \$948,894 for the first quarter, compared with adjusted 1951 profit of \$2,450,000 the same time a year ago.

The recent 25-cent dividend is paid to American's \$2,500,000 common stock. The rest of this year, AA says, "This will probably offset increased costs," the airline says.

At its lower load factors, the airline cannot operate its fleet. "Traffic" on the system for April has been excellent and if existing load factors increase, there should be a substantial increase in earnings for the second and third quarters.

American has about \$50 million worth of equipment on order for delivery by 1954. Financing method will depend on how earnings go the next year and cash-flow, which is firm is

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dependent on American's load factor. Capital Airlines (New-Memphis), Capital Airlines also has shown a healthy spring optimism in business. Capital's stocks are not so strong in American's, as the load factors are lower. But the pattern of their January-April sales pattern (1961-62) is almost identical. Here are Capital load factors in table:

	1962	1961	% Points
Jan	48.0	49.0	down 1
Feb.	49.0	50.0	down 1
Mar.	51.0	52.0	down 1
Apr. (36 days)	52.0	53.0	down 1

February was a bad month for American, Capital and probably all airlines among the New York area. The series of crises there is generally believed to have caused the slump. Also, February is generally a seasonal low because of weather and travel economies.

Air Safety Facing TV Antenna Problem

When Federal Communications Commission lifted the "ban" on new television frequencies last month, aviation interests and TV broadcasters squared off for an air safety "negotiation."

- How tall a TV tower is safe at what height?
- Who decides that question?

Construction of new ultra high-frequency station antennas is limited to one mile conflict with aviation safety at some locations. That's because UHF towers must be close to towers for airports, and they must generally be from 500 to 1,200 ft tall.

CIA Planning Officer D. D. Thomas is now chairman of an Air Coordinating Committee group drawing up a formula for "safe" TV antenna location and height with regard to airports and towers. FCC will suggest such a formula to the FCC.

Pilot-Involved-Air Transport Association recently suggested that Congress amend the Communications Act by empowering the FCC "... to refuse to issue or modify any license at construction power when ... after consultation with the FAA, the CAB, the Department of Defense, and the Treasury Department ... there is reasonable possibility that they may contribute a hazard to an aircraft."

Air Line Pilot Association is equally active in suggesting standards on which to judge TV tower safety.

John A. Fowler Subcommittee is now the official body representing aviation interests in FCC-sponsored talks with TV broadcasters.

But no matter what voluntary incentive they may agree on, one big issue remains: Is one aviation broadcaster

negotiation over any particular tower location and height breaks down, who is the final say? The issue, the state, FCC, CAA?

ACC Executive Secretary Charles Gay says that question has government layers stamped. Meanwhile, however, he looks for a more consistent approach on devising general standards for broad order and FCC guidelines in planning.

LAI Negotiates With Israel

(McGraw-Hill World News)

Tel Aviv—The future of LAI (Italian Air Lines) traffic to and from Israel hangs upon the success the airline will have in working out a method of inter-airport at least a portion of the Italian line's blocked funds which have been accumulating in Israel since March, 1948. A resolution to secure the issue has been scheduled for Rome.

"If we cannot have our frozen accounts unlocked we may discontinue our weekly flights between Lybia and Rome," LAI's local manager told McGraw-Hill World News. Several a favorable solution be worked out, the Italian carrier may increase its flights to three or four weekly.

The Rome negotiations are in cover granting of mutual facilities to LAI in Israel and EL AL in Italy.

LAI plans to begin a new Lybia-Thessalon weekly service this spring. This is seen as the beginning of an expansion move in some Asia and the Far East.

KLM Traffic Up

(McGraw-Hill World News)

Amsterdam—Locally known as KLM Royal Dutch Airlines' operations is reported in comparison of last year's figures with those for 1959 (data for 1959 are in parentheses): ton-miles, 158.5 million (117.1 million); passengers carried, 495,000 (416,000); ton of freight, 12,889 (10,296).

SHORTLINES

American Airlines reports Canadian customs has permanently approved possession of passenger baggage at Toronto-stated experimentally by American this January.

Cook Associates Board has delayed booking of the unscheduled airline is now the official body representing aviation interests in FCC-sponsored talks with TV broadcasters. But no matter what voluntary incentive they may agree on, one big issue remains: Is one aviation broadcaster

such a moment is to assure that it will be additional and supplemental to the presently existing service and not a mere duplication of such service."

Brokers Air Lines DC-4 landing accident at Miami on Sept. 14 was caused by inadvertent pulling of the wrong lever, causing the landing gear damage, leading suit. No one was hurt.

Flying Tiger Line stated "the first certified, although in service across the U.S. to the Pacific Northwest" last week, as it daily Seattle, Portland, Denver, Chicago, Milwaukee, East Coast C-46 flight.

Northwest Airlines March load factor of 68.04 compared with 49.6 a year ago, and revenue passenger miles jumped 41% to 47,064,736.

Pro American World Airways San Juan DC-4 crash landing by CAB is scheduled for May 5 in the Public Assessment and Park Administration Building, San Juan.

Panair Air Lines passenger miles the first quarter rose up 11% over a year ago to 10,000,116. Number of passengers carried 14% to 38,872. Air cargo increased 10% to 53,960 tons. Mail grew 19% to 24,023 tons.

Swedish Airways has won its court fight vs. Continental Southern Lines, a bus company that sought to pose legal bus CAB order restricting Southern's routes in the "humped Mississippi Valley" case in 1959.

Trans-Canada Air Lines plans to start service to Germany about Nov. 1, but may not traffic rights from the Civil Aviation Board of the Allied High Commission. Parcel rights TCA rights from Amsterdam to Düsseldorf and Hamburg.

United Air Lines has withdrawn its application for CAB approval of an unscheduled "freely plus" line from half price to three-quarters fare. United hoped after line would go along with its first revenue proposal, but had to reject when competitors said to the lower fare... Its budget for \$40,000 three sets of mailboxes (showing Central Air mechanical and electrical systems for engine testing... Con. pany has extended its VLF radio-tele phone communication system to the Midwest and Northwest.

U.S. Airways Kansas, N.Y., C-46 crash landing by CAB is slated for May 6 at the Lexington Hotel, New York City.

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'... Strange Leniency'

Bit by bit, the general press is catching on to the fact that there's something amiss in CAA safety.

Time magazine for Apr. 28 says:

The outrage was tragically foreshadowed... The plane caught one wing tip on the end of a slope, and plummeted into a hillside... The crew of three and all 26 passengers aboard were killed. The plane was a non-scheduled C-46 Comco Comco, operated by a non-scheduled carrier—the fourth avoided C-46 to crash in four months.

In Washington, the Civil Aeronautics Administration barely noticed the plane's opening, North Carolina Airlines, to come operations immediately. They admitted that the question had been under investigation for a year, charged with a raft of safety violations. With a strange sense of humor, the civil air authorities had allowed the line to stay in business pending an official hearing. (1)

In our mail comes a letter from a CAA Safety Agent, enclosing the Time clipping. He is in the Office of Aviation Safety. He signs his name, which we shall protect. He is another war correspondent, writing (obviously from the field). We shall let him write the rest of this editorial.

"I thought the attached would fit in well with your articles on QAS CAA. We conscientious people in CAA can only hope you keep up the fight. QAS certainly needs a house cleaning.

"The accident was another tragic result of incompetence in the top levels of CAA/QAS. The files are full of sound recommendations from field agents which were designed to prevent this and many other accidents.

"Such recommendations have been repeatedly ignored by the 'administratively qualified' chiefs. After the time is gone they make a pretense of looking the other way.

"After each such accident, Washington, historically, sends orders to demonstrate that they are 'on their toes.' After the particular accident orders were issued for all agents who are authorized to board an carrier aircraft to conduct at many inspections in possible 30 days.

"Many of the agents are assigned to scheduled air carriers and are unfamiliar with C-46 aircraft and with the question and maintenance authorization of the non-scheduled carrier.

"Under the circumstances, it is wasteful and inefficient to take those agents from their regular duties and assign them to the non-scheduled for 30 days." The agents are told to board the aircraft and ride to the first stop outside their region. The only effective method of conducting inspections is to assign an agent or agents to a given carrier on a full-time basis and to do away with the regional headquarters.

"One agent or one small group of agents can get to know the operations of one carrier thoroughly and can therefore be expected to have full knowledge of any serious deficiencies or weaknesses.

"But it is illogical to expect any results when scores

of agents spend short periods of time inspecting dozens of different operators in their own region.

"Why is it done that way? Because the regional office structure has time and again perpetuated the Administration that there is no sense why airline inspectors should not be handled just the same as a fixed base operator.

"Any CAA inspectors, any airline pilot, any official of a scheduled or non-scheduled airline, anyone who knows the business, can tell you the fallacies—the downright ridiculousness—of this house-and-hoggy theory as applied to modern air transport.

"But after the '30 days,' it will be business as usual, as each of the regions.

"At Time says, 'With a strange sense of leniency...'

What IS the Policy, Mr. Hensley?

EVER SINCE AVIATION WEEK revealed Mar. 31 that the newly installed chief of CAA's Aviation Safety Division in Region I—the nation's busiest—does not believe engine analysis contributes to safety, a small rebellion has been bubbling among airline pilots and flight engineers.

Unfortunately for E. C. Marsh, one of the editors of AVIATION WEEK was on hand one night covering an air safety hearing in Trenton conducted by a New Jersey state legislative committee. He took Mr. Marsh's statements down verbatim, and it undoubtedly appear in the official transcript.

We had some indignation and from airline pilots almost immediately. Most of the language was not printable.

It now develops that William D. Kest, president of the Flight Engineers' International Association, wrote Mr. Marsh Apr. 9, requesting a meeting "to determine whether the quotation mentioned above represents the official position of the Aviation Safety Division."

On Apr. 24, Marsh met with two Kest's representatives, two flying representatives, and four veteran flight engineers. The result? "Well, Marsh kicked out of it," one flight engineer informs us. "The same engineer says further:

"Because of the totally evasive answers that Marsh gave to their questions on Apr. 24, the men are preparing a written set of questions for him to answer."

We'll be interested in those answers. So, we venture, will a lot of airline pilots and flight engineers. So would a lot of other passengers—we also venture—if they knew the significance of it all.

Nearly everywhere you dip into the CAA's Office of Aviation Safety, you run into familiar examples like this—of incompetence or inefficiency or laziness, in high places.

P. S. Mr. Marsh occupies one of those brand new Grade 14 (over \$9,000) jobs set up, one in each CAA region, by the "reorganization" of the QAS, conducted along wondrously complex lines by its director, E. S. Hensley, and its deputy director, William Davis.

—Robert H. Wood

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